AMERICAN GAS JOURNAL

FEBRUARY, 1939

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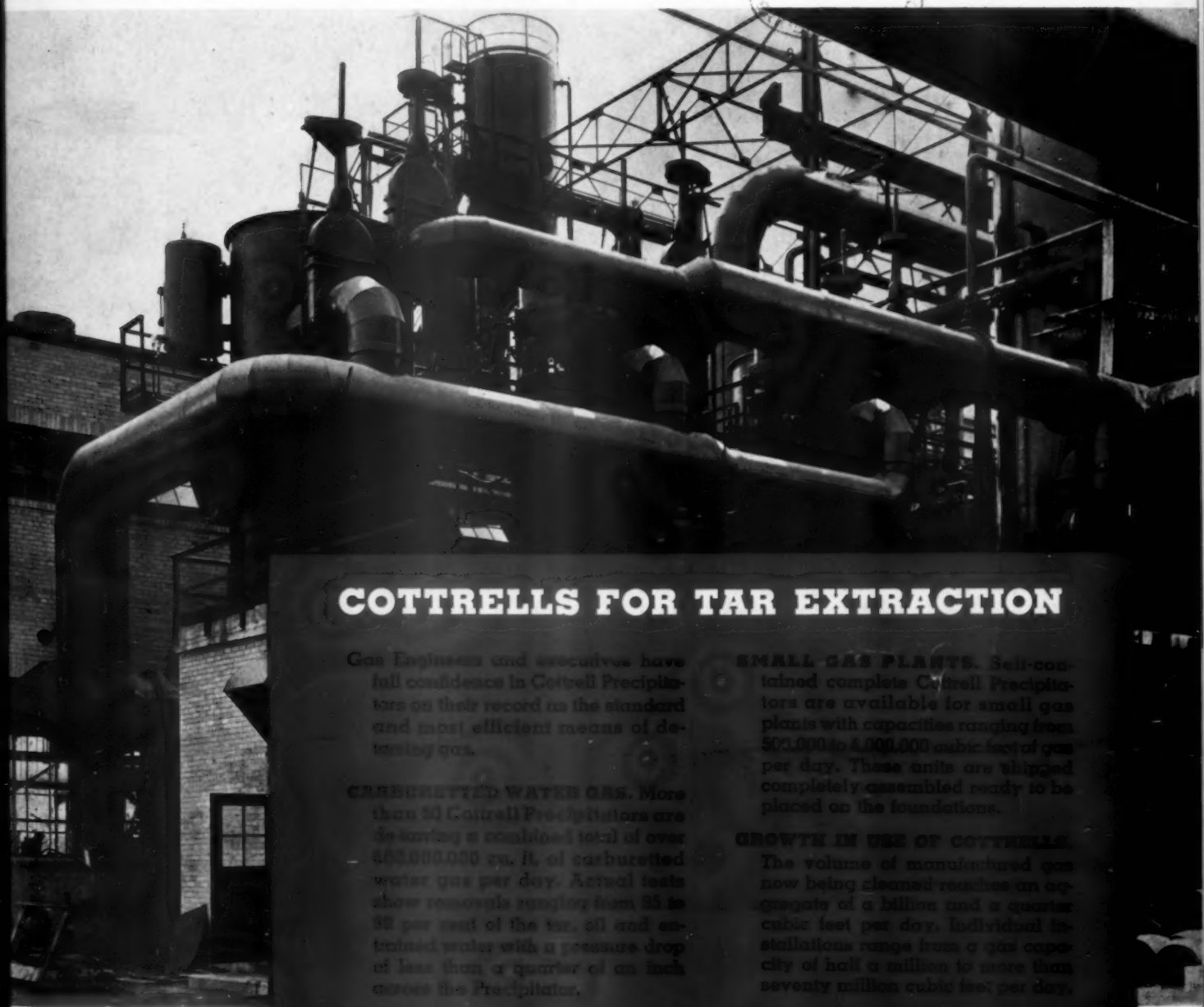

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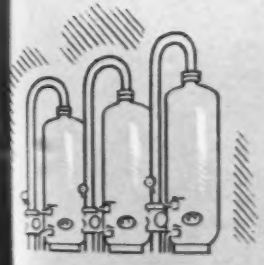

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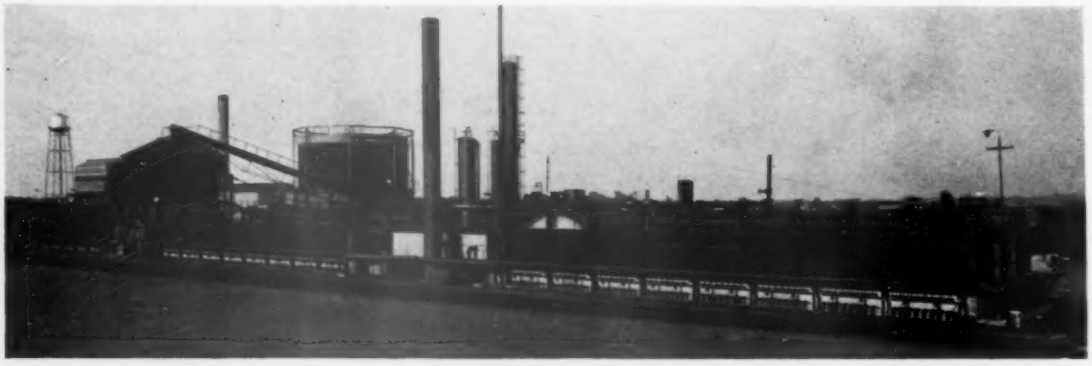

General View of Curran-Knowles Coke Oven Plant at West Frankfort, Ill.

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FEBRUARY
1939

AMERICAN
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Fuel Flexibility

An Asset and a Liability

by
Charles W. Merriam, Jr.
Sales Promotion Manager, Glenwood Range Co., Taunton, Mass.

ONLY those conditions existing at the point of use determine whether a gas range can operate up to the potential satisfaction inherent in its design and construction. To the extent that operating conditions in the field (particularly adjustments and a clean, constant gas supply) depart from a reasonable ideal, range performance in the home is penalized. These two statements of fact are perhaps obvious. Nevertheless, the experience of many competent observers indicates that these adverse circumstances (notably burner maladjustments) occur more frequently in actual practice than most utility executives either realize or are prepared to admit. An equally important phase in securing the maximum possible customer satisfaction concerns performance sacrifices necessitated by anticipated field operating conditions, such sacrifices being an inseparable part of the original design of the range. The question here is, what can be done by utilities and equipment manufacturers with their mutuality of interest in placing an improved cooking service in the home. Of such is progress.

Gas is rightfully styled the "Ideal Fuel." Most of the superior advantages of gas cooking spring from the housewife's ease and accuracy in obtaining heat when and as wanted. In the final analysis this basic asset of gas is a fuel flexibility, or stated in another way, the controllability of heat.[1] However, to this primary characteristic of natural flexibility must be ascribed in practice its greatest liability; i.e. heat release under difficulties of a variable supply of gaseous fuel, and under what is actually more important, the vagaries of burner adjustments dependent for precision upon the human hand and eye. In other words gas can be and is the best fuel for cooking only when the adjustment of and the operating conditions for modern ranges are reasonably ideal. Minimizing these admitted liabilities is regarded by many as being indispensable to an enduring or expanding gas cooking load. If and when the present irregularities of range performance, so distressingly prevalent, are eliminated, the full sales force of gas can become increasingly self-evident to the user.

CHARLES W. MERRIAM, Jr.

Prerequisite to solution of the problems under advisement is recognition of the fact that the modern gas range, in contrast to those of ten years ago and earlier, is a relatively complicated mechanism. Until recent years a service man equipped with a pair of pliers, a screw driver, a handful of door springs and catches, and ordinary common sense was equal to most occasions. In this era, however, an advanced degree of mechanical skill is a necessity; and the knowledge of an engineer is highly desirable. As laudable as simmer burners, automatic ignition, thermostats, all enamel ovens and exterior surfaces, etc., are there is small wonder that both complications and higher service expense are the order of the day. Incidentally the C. P. program has not simplified these particular complexities. Irrespective of the debatable merits of these evidences of modernity, wrestling with the service problems involved is an unavoidable executive responsibility if widespread customer satisfaction and maximum profit are to be achieved.

Presupposing two fundamentals, namely, first, good design and sound construction, second, intelligent use in the home, what are the more important variable factors bearing upon

[1] *In contrast to the three competitive fuels, coal, oil and electricity, a few of the practical home benefits traceable to the flexibility of gas are:*

a. instant maximum heat released at the start.
b. heat release abruptly ended as desired without consequential heat storage in fire box, burner shells or coils.
c. accuracy of heat release to accommodate variable quantities of food to any method of top cooking desired, including waterless or semi-waterless, without steam escapement.
d. constancy of oven temperature because of ability of the thermostat to throttle gas instead of the "all on" or "all off" of the electric circuit or of the "guess-as-guess can" with either coal or oil.

Adding up the above in terms of convenience, time saving, fuel saving and food saving quickly discloses flexibility as the principal attribute from which gas advantages stem.

the ability of the modern gas range to permit of optimum home performance within the limits of present ranges?

A brief summary follows:

1. Thermal value—Variation in B.t.u. content in the vast majority of instances is negligible. For various reasons thermal values are closely regulated when possible in normal operations.

2. Specific gravity— Sizeable increases or decreases in density of a seasonal character are not uncommon particularly in the manufactured gas industry. Frequently these variations are difficult to control while still retaining proper Btu.[2]

3. Rate of flame propagation—Increased "climb back" speed tends toward burner "flash backs" and poor "turn downs." A lower flame speed results in elongation with impingement dangers or in flame lifting away from ports. Any change in chemical composition altering the rate of flame propagation affects ignition. Because of technical involvements this element is frequently disregarded.

4. Impurities— Reduction in naphalene, solid and liquid phase gums, tar, sulphur, pipe dust, scale and other foreign matter condensations and deposits is a never ending problem. Results of faulty adjustments are often mistaken for the presence of impurities in objectionable quantities.

5. Pressures—Hourly and seasonal pressure changes are inescapeable, although in most cases careful operation can eliminate objectional variations. Househeating gains, growth of suburban demands, dead end mains and partial stoppages of service lines, meters and house piping are contributing elements. Here "borderline" adjustments can be confused with pressure difficulties.[2]

6. Adjustments—In most instances mechanical adjustment of spuds is the most important and tenacious single factor. These include burners in all three cooking zones, pilots and thermostat bypass. In a secondary manner this phase also involves air shutter adjustments.

The first four items above relate essentially to the plant source of gas supply. Although inseparable from the total problem, I believe these four can with propriety be disregarded for the purposes of discussion here. By elimination then our attentions are focused on the two remaining factors, "Pressures" and "Adjustments."

[2] *Variations in Btu. input to burners caused by gravity and pressure changes are not as large as ordinarily supposed, because inputs do not vary directly either as gravity or as pressure. For instance with a normal pressure of 6" a reduction to 3" would not cause a 50% but only a 28.7% decrease in input. This somewhat smaller variation is caused by quantity varying not directly but as the square root of the pressure,* $Q \propto \sqrt{P}$ *(in.* H_2O*). Similarly with a normal gravity of .40, an increase to .60 would not cause a 50% but only a 17.3% decrease in input. This smaller variation is caused by quantity varying inversely as the square root of density,* $Q \propto \sqrt{\frac{1}{d}}$*. Many complaints arising from these two causes are traceable back to "borderline" adjustments so close to the maximum or minimum points of critical air-gas ratios that adverse changes produce yellow tips, lifting flame or flashbacks.*

The maintenance of continuously exact pressures at the orifices of each and every appliance connected to a given so-called low pressure distribution system through the use of plant and district governors, is a virtual impossibility. Note that only the pressure at the appliance affects the B.t.u. input, the so-called street pressure and intermediate gasways being but factors influencing gas at the spud. Keeping these fluctuations within those limits which permit of satisfactory gas use in the home is a routine task. For the most part this regulating of pressures is well done, a plus and minus standard maximum of 1½ in. water column at the appliance being commonly adhered to, even despite seasonal and hourly changes in customer load demands. Failure to so perform this work for any cause inevitably results in numerous service calls, the greater the deviation from normal the larger the number of complaints per 1000 meters. But the main point bearing on this discussion is that all domestic gas appliances in any given distribution system, if subject to the run-of-main pressures, must be equipped with adjustable spuds. Thus flexibility enters the adjustment equation and furthermore pressures can and do effect all burners even after the adjustments have been made.

The chief difficulties arising from such pressure changes as do occur at the appliances connected to the average distribution system involve such "borderline" adjustments as:

1. Gas input so high that a slight pressure increase forces the facilities beyond their capacity for proper combustion.[3]

2. Primary air so low (soft) with respect to the half-way between points that a small pressure increase produces a yellow flame.

3. Gas input so low that a minor pressure decrease retards objectionably or even prevents ignition.

4. Primary air so high that a small pressure drop increases flashbacks.

In addition, numerous other factors are influenced by pressure changes such as: oven preheating speeds, low minimum oven temperatures, baking, stable bypass and pilot adjustments, to mention but a few.[3] Casual inquiry quickly establishes the inextricable relationship between pressures and the adjustable spud on the one hand, and acceptable customer cooking service and high cost repeat adjustment calls on the other hand. At the very least, fairness demands the admission that variable pressure introduces added complications to the service man's already difficult job. Under the Utopian circumstance of no appreciable pressure fluctuations a sizeable burden and a considerable service expense could be removed from the shoulders of the service department. Is such hope a pure fancy? Is the expense of an individual appliance pressure regulator exorbitant when weighed against the savings? Do the disadvantages outweigh the advantages? Too quick decisions for or against in most matters are costly.

Before pontificating on the subject of individual appliance regulators, consideration might profitably be given to that second major variable "Adjustments." No matter how perfect the range or how constant the gas supply, faulty burner adjustments can upset the proverbial apple cart. Other variables frequently act as the whipping post for what in actuality is an injudicious Btu. input or improper air shutter placement. Under the present system in vogue the character of the original and all subsequent burner settings is entirely in the hands of the service man on the customer's premises. Settings 30% below and 60% above burner ratings are not at all unusual. In general, management seemingly regards a minus 25% and plus 33⅓% as an acceptable standard, or with a shrug of indifference complacently dismisses the problem as inconsequential. As a matter of fact the service man who can adjust top burners closer than these latter limits is more the exception than the rule. As to whether the blame for coping more successfully with the difficulties of adjustments lies with lack of executive planning, service department inadequacy or incompetence of the equipment manufacturers is for the moment immaterial in contrast to the importance of recognizing the basic nature of the fuel, flexibility.

Regard briefly the competitive fuels. Complete absence of flexibility except through the medium of adding more multiple or positive switches is in one respect a substantial source of strength of the electric range—figuratively speaking, plug the contraption in and the blinking thing either goes or does not go.

[3] *Apart from the aggravations and service expense accompanying abnormal pressure variations, as well as commonly considered hazards, such as pilot outages, and top burner flame impingements with consequent carbon monoxide generation and by pass extinguishments, the very efficiency of the modern range has contributed to an additional safety problem. Among other things involved in bringing about high oven thermal efficiencies has been a widespread cutting down of excess secondary air. Reducing this margin of safety has imposed the need for more extreme caution in eliminating substantial overadjustments. For instance, whereas by flue analysis excess secondary air commonly exceeded 350% it is now frequent to encounter excesses of under 125%. Few oven burners today can sustain overloads of 25% in Btu. input without presenting serious combustion problems.*

Despite voltage regulation and three wire circuit problems, the fuel is comparatively accurate within the restrictions of its flexibility at fixed position speeds. In selling arguments the accuracy of electricity bowls over poorly harnessed flexibility of gas, at least in the hands of the partisan and admittedly with a portion of the public. On the other hand solid and liquid fuels are not as susceptible to combustion adjustments as gas and lack the accuracy of electricity. In point of fact, other than a very debatable cost factor, solid and liquid fuels for cooking purposes have a few of the natural advantages of either electricity or gas. The service and utilization complications of coal and oil eclipse those of gas by a wide margin—definitely the pastures there are not greener. And still the question revolves fundamentally around flexibility.

One might infer that criticism has been spilled herein on the heads of gas utility service departments. Such is decidedly not the case because the feeling is more one of sympathy. Whatever the causes for the development of the modern range, the complexities of ordinary adjustments confronting the average service man are enough to confound the experts, not to mention the service man who by force of circumstance is probably underpaid with respect to the skill required. Ponder for example that a separate broiler, divided top CP range has a giant and three standard top burners, each of the four having separate adjustments for the simmer device, or double the number of but a few years ago. Topping this there is an oven and a broiler burner whose critical nature demands accuracy lest underadjustment result in lack of advertised speed or lest overadjustment produce combustion and other difficulties. Then the four pilot lights must be dealt with, two of which might require tinkering with a safety shut-off mechanism. Finally there is the thermostat by-pass, which if too high prevents the maintenance of low enough minimum oven temperature. These dispose only of the gas adjustments. To this must be added the thermostat itself, and perhaps a temerature indicating device needing a watch repairer's touch. Crowning these efforts are such things as the cumbersome enclosed manifold with well-hidden valves, balanced coveralls, pull out broiler carriages, drop doors, and the compact whole encased in enamel (glass laid on steel sheet). To this must be added by most domestic service men a working acquaintance with water heaters and Electrolux refrigerators whose intricacies are at least the equal of the modern gas range. Dealer men and plumbers too are becoming an increasingly prominent factor in some cities. Being cognizant of the multiplicity of new models each year, one must admit the extent of knowledge demanded of the gas range service man. Maybe the word sympathy is too mild?

In most utilities the service men are subjected to never ending courses of instruction the better to prepare them for handling their principal tasks. Far sighted representatives of manufacturers collaborate with these schools, whose progress seldom equals expectations. One of the conceptions most obscure to the average service man is the effect that primary air has on the length of the flame. Most willing learners can be taught that a given burner should have a flame of a given length, such, as for instance, a one-half inch inner cone. However, it is quite another matter to teach that this same half inch flame can be pulled down to less than a quarter inch by merely increasing the proportion of primary air. Or put in another fashion it is seemingly impossible to drive home the idea that two half inch flames of the same length may vary in heat release by as much as 50% by altering the primary air-gas ratio. That primary-secondary air notion is tough chewing for the majority when applied in the field for the purpose of securing proper Btu. inputs. Incidentally it is of corollary interest that gas is the only fuel in which there is a differentiation between primary and secondary air. And the results?—they are for the main part rather less than perfect, and in the extreme are positively disastrous. Of all the nettling problems connected with the modern gas range, the mechanical adjustment of burners is deemed by most discerning observers to head the list. Many believe that because of the flexibility of the fuel, coupled with *human nature as is*, a satisfactory solution is impossible of accomplishment except by the use of the fixed orifice—individual pressure regulator method.

Accompanying most choices in business, even as in life, the advantages are balanced or partially offset by detrimental features. When the good outweighs the bad, profit enters in. Up to this point we have examined a few of the difficulties that might be remedied or bettered by the adoption of the fixed orifice—regulator method for new range installations. Two outstanding disadvantages deserve careful consideration, to wit, the initial cost of so equipping each range and the possible added stoppages[4] of gas supply at the regulator and orifices. Other plausible objections might be offered, but these are the only two not easily answered.

At present there are in daily service upwards of a million gas refrigerators whose fuel is regulated by an appliance governor as virtually standard equipment. In fact, to secure good combustion within such an enclosed chamber a regulator is commonly assumed as being prerequisite. And rightly so. Analysis of service records from any reliable company will quickly establish how negligible are complaints arising from gas stoppages traceable directly or indirectly to the use of regulators on refrigerators. Combustion for oven and broiler has much in common with that for refrigeration, although to be sure one is to produce ultimate cold and the others are for heat. But in any application the heat release must for the best results be nearly constant when at maximum gas flame. The regulator achieves this successfully for the refrigerator, why not for the range? However, if one conditions his judgment of present appliance regulators by experiences with antiquated house governors of fifteen years ago, conclusions will be far afield. Comparatively speaking the old-time governors were but troublesome, throttling valves. Appliance regulators are now placed on gas refrigerators because such practice reduces service calls, promotes customer satisfaction and is a generally profitable investment—a million of them. The refrigerator may "have somethin' there" as the current saying goes for the modern range. Development of the appliance regulator has been hastened in its advance also by the bottled gas industry. At least we have eloquent testimony in our own backyard that the appliance governor as applied to the refrigerator is definitely not overwhelming the man-

(Concluded on page 50)

[4] *"Dirty" gas is a phase of operations certain to come in for closer scrutiny as automatic appliances become more prevalent. Selection of raw production materials, more precise and scientific plant operations and the capacity of condensors, liquid and dry scrubbers and purifiers as well as electrical precipitators, main fogging and other means are constantly being studied by alert management to clean up unclean gas conditions. Under the stress of their own problems the sales and service departments are prone to overlook these efforts.*

Range manufacturers can do much to aid gum deposits as one cause of reduced stoppages by: 1) longer channel orifices and other ways of reducing gas turbulence, 2) substitution of plug cocks for needle valves, 3) removal of pilot valves from heat zones, 4) cleaner drilling of orifices to eliminate burrs, 5) improved design of orifice tips, 6) closer tolerances in flash tube assemble. Except in specialized circumstances individual filters are regarded by many as being hardly an appropriate solution—just sort of postponing the evil day.

Avoid Common Legal Pitfalls

by
Leo T. Parker
Attorney at Law
Cincinnati, Ohio

VERY often "fraud" is a legal pitfall. This is so because few gas company and municipal officials understand the legal interpretation of the term "fraud."

For example, few persons realize that a verbal agreement to sell real property is void and unenforceable, unless one of the parties does some act which is a part or whole performance of his obligations assumed under the verbal contract. This rule of the law is based upon the "Statute of Frauds," a universal law designed to prevent fraud by any person claiming valuable rights under verbal agreements which he may prove by false testimony.

For instance, in Forbes v. Los Angeles, 282 Pac. 528, it was disclosed that a *verbal* contract was made between a municipality and a property owner by the terms of which the latter agreed to sell his property to the city for utility uses. Later the property owner filed suit to rescind the agreement on the contention that the contract was void because it was not in writing, and also because the city had not in any way started to perform its part of the contract. It is important to know that the higher court held the oral contract void, stating the following important law:

"The contract being oral, it was essential that appellant prove sufficient part performance to take it out of the statute of frauds. . . . Such a contract 'could only be taken out of the statute and enforced by reason of part performance', . . . Treating the action as one for the specific performance of a contract relating to real property, it was necessary to prove . . . either that the contract was in writing or that it had been partially performed. . . . The case is reduced to an action to enforce a parol contract to convey real estate. Such an action is maintainable *only where there has been a part performance sufficient to take the agreement out of the statue of frauds.*"

In other words, the "Statute of Frauds," now in effect in all states is intended to prevent fraud, and by its effect verbal contracts to convey real property are void although neither of the contracting parties actually practiced fraud.

Different Classification

Another important point of the law is that in many instances municipal or gas company officials may be guilty of "legal" fraud although actually no fraud was practiced. And generally speaking, any person who misappropriates money of a private or public corporation is guilty of fraud. This is particularly true if the money thus appropriated is used to improve the appropriator's private property.

For example, in Atkins v. Hughes, 282 Pac. 787, it was disclosed that directors of a gas corporation used the company's funds to erect an improvement on property belonging to one of the directors. Suit was filed to recover the amount thus expended. The directors contended that as the improvement was used to advantage and benefit of both the corporation and consumers, the fact that it was erected on the property of one of the directors did not constitute fraud. However, the court held as follows:

"The fraud is so apparent and manifest that it is unnecessary to go into any lengthy details or give any extended reasons for so holding. . . . The construction by said board of directors of the improvement at the expense of the corporation was the use of the funds of said corporation to improve and benefit the private property of Hughes. It was an illegal and unlawful use of the corporate funds. . . . While the board of directors are clothed with broad powers and are given wide discretion in the management of the affairs of the corporation, and the expenditures of its funds, it was an abuse of that discretion for said board to use the corporate funds to improve the property or to advance the individual interests of any one or group of stockholders to the detriment of the balance of the stockholders."

Fraud V. Public Policy

In many instances certain acts and contracts may not be classified as fraud, but against public policy which means that to hold the acts or contracts legal would be to the detriment of a majority of citizens.

Also, in many instances contracts are held void and against public policy, particularly if the testimony shows that either party was unduly influenced.

For example, in Philpot v. Taylor, 16 S. W. (2d) 4, a contractor named McNulty submitted the lowest bid on construction of a public works. Later it was discovered that the engineer of the district was the contractor's partner in another business. In view of this business connection, the court held the contract void, saying:

"The transaction was contrary to public policy, and void throughout . . . it would be contrary to public policy for commissioners to let a contract either privately or publicly to a contractor whose business partner was the engineer of the district. The engineer of the district is practically the final arbiter in the settlement of all disputes, and it would be contrary to public policy to burden him with the temptation to favor his partner when such disputes should arise or to favor him in the grades of materials to be used and the character of workmanship to be done."

Legal Status of Municipality

It is well established law than an incorporated city is, in some respects, a subdivision of the government and is vested with certain governmental functions. For illustration, it is a part of the duty of municipal officials to provide for improving its streets and installing and improving gas distribution systems. When performing that duty in the manner authorized by its charter, the city is exercising its governmental functions. Moreover, municipal ordinances adopted for the purpose of discharging governmental duties are local laws of which the inhabitants, and all others dealing with property over which the city may assert jurisdiction, must take notice. Therefore, property owners are expected by law to investigate and determine the pro-

visions of city ordinances which provide for improvements and assessments against private property. And although property owners are assured by public officials that their property will not be assessed, such promises do not change or alter the meaning and effect of such city ordinances. So held a higher court in the late case of Johnson v. City of Dallas, 78 S. W. (2d) 265.

The facts of this case are that a city council passed an ordinance which provided for certain improvements and assessments of the costs thereof against specially benefited property owners. Many property owners appeared before the officials and contended that their property would not be benefited by the improvements. They were assured by the officials that their property would not be assessed. Notwithstanding this assurance the properties were assessed.

The property owners filed suit and contended that they relied upon the representations of the officials, and were led to believe that no assessment would be made against their property, and that the subsequent assessments without further notice and hearing constituted legal fraud. However, it is interesting to know that the higher court held the property owners bound to pay the assessments, and said:

"It was the duty of the plaintiffs (property owners) not to allow themselves to be lulled to the sense and feeling of security, because of the alleged promises which the officials were clearly unauthorized to make. . . . The ordinance of the city adopted for the purpose of assessing against the abutting property owners a part of the cost of the improvements was a public ordinance which had been made final in the manner required by the city charter and the relevant statutory regulations. The inhabitants of the city were charged with notice of the adoption of that ordinance and of its provisions, whether they had actual notice or not."

Validity of Assessments

Generally speaking, an assessment is valid if the benefit to the assessed property is reasonable in consideration of the assessment made, or the fair market value of the property has been increased by the construction of the gas distribution system to an amount at least equal to the assessment.

For example, in McGuire v. City of Hudson, 242 N. W. 555, a property owner was not satisfied with the amount of the assessment against his property and he filed suit. However, since the value of the benefit to the property by construction of the system exceeded the total amount of the assessment, the court held the assessment valid and enforceable, and said:

"In this as in any other case, if the assessment of costs exceeds the amount of the benefits, of course it constitutes a taking without due process of law."

Obviously, an assessment is void against property not benefited. In one leading case Land v. City, 2 Pac. (2d) 238, a city assessed lots not near the improvement. Therefore, since these lots were not benefited by the improvements, the court refused to uphold the validity of the assessments.

Another well established rule of the law is that a property owner, who objects to paying assessments, is bound to prove that the assessments are illegal.

For example, in Fulton v. Sherman, 238 N. W. 88, the property owners who objected to paying assessments, failed to prove that the assessments were illegal. Therefore the higher court held the assessments valid, and said:

"A presumption is entertained in favor of the action of the commissioners. . . . The report of the commissioners spreading the assessment is presumed to be correct. . . . Consequently the burden is upon the appellant (property owner) to show that the board of supervisors did not properly assess the land in question."

Ownership of Streets

Frequently, the legal question is presented as to why property owners cannot require municipalities and gas companies to pay for use of streets abutting private property.

Therefore, it is important to know that a municipality has control of its streets and that property owners do not have any control except as may be authorized by the municipality.

Therefore, when permitting public utilities to install gas mains or other apparatus in the streets these permits carry the *implied authority* of the city to construct other municipal improvements, such as laying of water mains, without being liable for damages to gas mains and apparatus in the streets, unless it is clearly proved that the injury resulted from negligence of the municipal officials.

Various courts have held that a city may without liability tear up its streets for making necessary improvements and, in the absence of state laws defining liability or negligence in performing the work, the city is not liable for payments of expenses or other damages sustained by gas corporations, although the latter had received a permit and had a legal right to use the streets. The latest higher court case on this subject is Louisville Co. v. Commissioners, 33 S. W. (2d) 344.

The facts of this case are that the commissioners of a city considered the practicability of making an open ditch through a street for installing sewer pipes. However, since this would result in the interruption of traffic, the commissioners decided to construct a tunnel beneath the surface of the street. A contract was made with a contractor to build the tunnel and to install the pipes.

After the work was partly completed the soil beneath the street and above the tunnel sank at various points and the pipes, mains and conduits of a gas corporation were caused to break. The company was required to make the necessary repairs at a considerable cost, and then sued the city for damages. Since the gas corporation did not prove that the work of constructing the tunnel was carried on in a negligent manner, the higher court refused to hold the company entitled to recover damages, and said:

"Appellant (gas corporation) placed its pipes in the streets of the city, subject to the right of the public, through its proper municipal authorities, to make such use of the streets as might be necessary to protect the public health and safety. The city authorities could not by contract deprive the city of the power to make, in the future, such use of the streets as the public health or the public safety required, and the company took its rights under its franchise, subject to these limitations. . . . Under the authorities above cited appellant placed and maintained its pipes in the street subject to the police power of the city. It did not have an absolute property in the street or the right absolutely to maintain its pipes in the street. Its rights were subject to the police power of the city."

Service Pipes

The question whether a gas company can legally require its customers to lay or pay for service pipes often has arisen. Generally speaking, the courts have held that this cannot be done in the absence of statutory regulation, and where the franchise ordinance fixes the gas rates to be charged, mere rules and regulations of the gas company making such requirement have been declared to be unreasonable, unjust and

unenforceable. (See 168 Cal. 295; 163 N. Y. 158.)

On the other hand, the law is well settled that a city ordinance *authorized by a state law* is valid by which a city requires the consumer to stand the expense of laying service pipes. (See 118 Ill. 329; 103 Wis. 225.)

Another important point of the law is that the right of private corporations to sell gas to consumers in any given community is dependent upon authorization given by state laws. Of course, authority may be delegated to municipalities. In other words, the paramount rights of the public are exercised and controlled by the State Legislature. And not withstanding such laws gas companies may be liable for failure to reconstruct streets in good condition, or failure to keep equipment in good repair and safe condition.

For illustration, in Nord v. Butte Water Co., 30 P. (2d) 809, it was shown that a city granted a franchise to a utility company to lay mains and supply service to the inhabitants. This contract was made by authority of a state law which authorized cities and towns to issue permits for use of its streets and alleys for installation of mains and equipment with the condition that the streets and alleys must be placed in as good condition by the person or corporations making the excavations as they were before the excavation was made.

The legal question arose whether the utility company was liable for failure to keep that part of the equipment in good repair which by contract the consumer was required to install and keep in good condition. In holding the company primarily liable, the court stated the following important law:

"Under this statute the city had authority to grant the company the right to lay its 'pipes and mains,' and this 'carried with it the obligation to keep them in repair'. . . . By imposing upon the consumer the duty of keeping the box in repair, the company but makes the property owner its agent for the performance of its public duty to maintain that instrumentality in repair. . . . The box is clearly a part of the company's 'system . . .' . . . and that duty was not affected by the circumstance that the cost of labor and materials used in the construction of the connecting box was paid by the occupant or owner of the property."

Simplified Efficiency Chart For Gas Plant Boilers

By W. F. Schaphorst, M.E.

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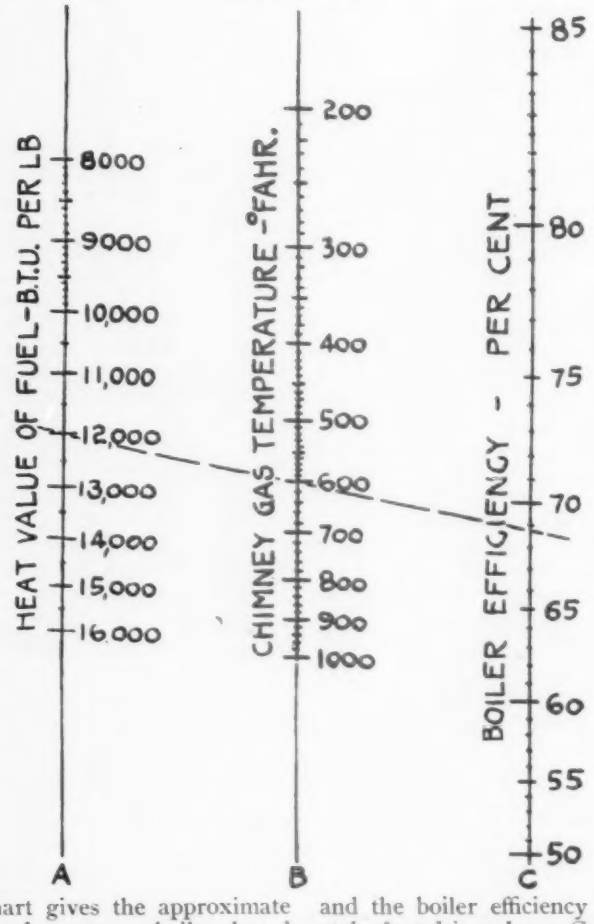

This chart gives the approximate efficiency of a steam boiler based solely on chimney gas temperature and heat value of the fuel. Simply run a straight line through the heat value of the fuel, column A, and the chimney gas temperature, column B, and the boiler efficiency is immediately found in column C. Thus, the dotted line drawn across this chart shows that if the heat value of the fuel is 12,000 B.t.u. and the chimney gas temperature is 600 deg. F., the boiler efficiency is about 68.8 per cent.

In developing this chart the writer carefully studied the averages of a number of authoritative tests where the boiler efficiencies varied from a trifle over 60 per cent to nearly 80 per cent. The heat value of the fuel was considered in each case, together with the temperature of the chimney or exit gases. As a result, this "rule" was derived: "Multiply the temperature of the exit gases in deg. F. by 625 and divide by the heat value of the fuel in B.t.u. per pound. Then subtract that from 100. The result is the approximate boiler efficiency in per cent." This will be found to be a good "rough" rule. Of course if the fire is poor, so that the gases contain a large per cent of CO, the rule naturally will not hold.

For example, what is the approximate boiler efficiency where the heat value of the fuel is 12,000 B.t.u. per pound and the chimney gas temperature is 600 deg. F.? Apply the above rule and the result will be found to be 68.8 per cent just as indicated by the dotted line through the chart.

The chart will be found of further value for showing how important it is, always, to maintain as low a temperature in the chimney as possible. Thus, if you have a fuel whose heat value is 12,000 B.t.u., swing a straight line about that point (column A) as a pivot. If you can reduce the temperature of the chimney gas 100 deg. the boiler efficiency will be found to be approximately 74 per cent, or an increase of about 5 per cent. So much fuel is wasted up chimneys at the present time, in spite of all that has been said, that it is hoped a study of this chart will clearly show the seriousness of high exit gas temperature.

The Melting of Metals

Part 2

Aluminum

by

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IN following our arrangement of discussing individually the more common metals in the order of ascending temperatures of melting, the next metal encountered is aluminum. Aluminum melts at 1218° F, the liquid having a heat content above 60° F of 457 Btu per pound at that temperature. Aluminum is distinguished by the highest latent heat of fusion (169.2 Btu per pound) of any of the metals, and by a specific heat exceeded only by magnesium. Hence in spite of its relatively low melting temperature, the fuel consumption necessary to bring about that change of state is comparatively high. Burner equipment of the blast type is required. Metal pots rather than fireclay crucibles act as containers, with cast iron pots standing up far better than pressed steel.

Next to magnesium, aluminum is the lightest of the metals, weighing approximately 165 pounds per cubic foot and hence requiring pots and furnaces larger in size for equal production. This property was a decided advantage in a local die casting plant where the management wished to use the same pot furnace for the manufacture of both zinc base and aluminum base alloys. Since the pot held but one-third as many pounds of aluminum as zinc, and since the aluminum required approximately four times as much gas per pound, the same burner equipment (a low pressure inspirator set with tangentially firing tunnel burners) functioned satisfactorily for both.

In quoting gas consumptions for aluminum melting as well as for the metals that follow below, one must keep in mind the fact that the first heat from a cold furnace requires quite a bit more fuel than later heats from a hot furnace. This of course is due to the heat that is absorbed by the furnace lining and the container in coming up to the necessary temperature. Hence guarantees should clearly state "after the first heat" or "on the basis of at least—heats per —hour day." Furthermore, since the flue gases must leave at a temperature well above that of the liquid metal, and since the liquid must be at a temperature far enough above the melting temperature to take care of the drop that will occur in pouring and carrying the liquid to the molds, the available heat of the gas will be far less than that corresponding to the melting temperature. Add to this the very sizable loss in radiation from the surface of the molten metal, the usual thin, uninsulated furnace lining, and the normal foundry practice of sacrificing fuel efficiency for speed, and we see why gas consumptions appear high for melting processes as compared to most other gas usages. Since our competitor, fuel oil, has to work under the same conditions, we have nothing to fear from that angle; but when electric melting is involved, conditions are usually different. Well insulated furnaces are customary. Often the bath is enclosed, thus reducing radiation loss from the surface. The speed may likewise be reduced. All of these are factors contributing to higher efficiencies and tending to reduce our natural advantage in the number of Btu's furnished per dollar. Gas furnaces can be constructed so as to be more efficient; but too often they are built as the consumer has always requested, without any attempt being made to educate him to demand something better.

As an illustration of increased gas demand for the first heat from a cold furnace, the following will serve. A local plant cast aluminum into rolls subsequently used in the manufacture of wall paper. The furnace was of the tilting type with a pot of 550 pound capacity, having burner equipment of a rather crude type consisting merely of a mixing tee for 1050 Btu natural gas at 6" pressure and air at 11 ounces. The mixing tee was 2½" and the burner merely a 2" nipple. With such equipment good results depend on the skill of the operator, since his eye is the sole judge of proper proportioning of air and gas. (I must confess, however, that a good furnace man is surprisingly accurate; and I have taken Orsat gas analyses occasionally after such hand adjustment and found them exactly as desired. But such skill only comes with long practice, and it is dangerous to trust too much on finding it in every plant.)

The first heat on the day in question required just 3 hours and consumed 2200 cubic feet of gas, or 4 cu. ft. per pound. The second heat started 50 minutes later, took 2 hours and required 1600 cubic feet of gas, or 2.91 cubic feet per pound. On another day three heats were run taking 2 hours 50 minutes, 1 hour 20 minutes, and 1 hour 5 minutes respectively, all proving the well recognized fact that high efficiency goes hand in hand with high production.

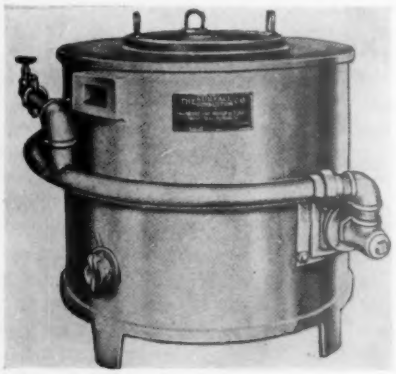
The following table gives comparative melting data for oil and gas fired aluminum pot furnaces, that we obtained in two local plants. Both plants had tilting type furnaces of nearly the same size and were engaged in the same work:

In plant B gas had replaced fuel oil by converting the existing furnaces. Although a detailed test on oil was not available, on the basis of monthly fuel consumptions the Btu replacement was 1 Btu of gas to 1.23

	Plant A	Plant B
Fuel	Oil	Gas
Burner system	Oil @ 30 lbs. Air @ 14 oz.	H.P. inspirator set 2-1½" tunnel burners
Capacity of pot	400 lbs.	300 lbs.
Heats	6	6
Time	7 hr. 36 min.	5. hr. 52 min.
Fuel burned	54.5 gallons	5150 cu. ft. (900 Btu)
Ave. fuel per hour	7.25 gallons	870 cu. ft.
Metal melted, lbs. Aluminum	2159 lbs.	1552 lbs.
Melting rate, lbs./hr.	284	264
Fuel per 100 lbs. melted	2.52 gal.	332 cu. ft.
Btu replacement	1.18	1.

of oil, which checks the tabulated oil figure above very closely.

In still another local plant a gas fired furnace similar to those of Plant B, but using two valve control and a mixing tee, melted 1,530 pounds of aluminum in 6 heats averaging 1 hr. 51 minutes per heat and requiring 4.57 cubic feet of 900 Btu gas per pound of aluminum. A lighter scrap in the charge probably accounts for the lower efficiency and the longer time per charge. Just how much of the apparent poor showing is due to the two valve firing system is a question. The word "apparent" is used advisedly, as conditions vary to such an extent from one plant to another that one should not be too positive as to which plant is the better. The alloy may vary in composition; and hence heat demand, the temperature reached and the time held at temperature before pouring, as well as the time required to pour all affect fuel economy, not to mention such things as the condition of the furnace lining and the skill of the operator. Only in the same plant under identical conditions can true comparisons be made.



S. C. Rated Pot Type Aluminum Melting Furnace, High Pressure System.

One manufacturer of standard furnaces for aluminum melting states under "Performance" the following: "Aluminum melting requires approximately 5.75 cubic feet of artificial gas per pound of metal melted for the first heat. Subsequent heats require 3.5 cu. ft. to 3.12 cu. ft. per pound." With his furnace, employing as it does automatic proportioning one valve gas burner and a lining with 5" of insulation backing up the 4½" of firebrick, such performance is possible. With the usual converted oil furnace it is not. Hence it is recommended that wherever possible new, well built furnaces be installed rather than attempt be made to do anything with the usual battered piece of equipment that has served on fuel oil.

Copper, Brass and Bronze

Copper without question is the most important of all the non-ferrous metals. Its world production exceeds the others, although closely pressed by zinc and lead, while its dollar value and variety of uses far exceed all others. Roughly 80% of copper is used as such, while 20% goes into alloys, among the most prominent of which are brass (its zinc alloy) and bronze (its tin alloy.

The more common of the brasses are yellow brass, red brass, and "eighty-five, 3 fives." Yellow brass or "high brass" averages about 65% copper and 35% zinc. It is the cheapest form of brass suitable for the more severe cold working operations. It is used widely for stamping, blanking, drawing, spinning and forming operations. In the sheet form it is used for many ornamental purposes. Large quantities of tubing and pipe are made from "high brass," as well as the rod stock from which wire, screws and rivets are produced. Red brass runs 85% copper and 15% zinc. In this proportion it has the greatest resistance to corrosion, being likewise capable of extensive hot working. It is used for "hardware, radiator cores, plumbing pipe, condenser tubes, and flexible hose." Eighty-five 3-fives, as the name indicates, is 85% copper, 5% zinc, 5% lead, and 5% tin. This alloy is the one usually used for brass castings, as it has very good casting properties together with easy machinability and high resistance to corrosion.

Battery of Gas Fired Pit Furnaces. Tongs Lifting Crucible of Molten Bronze

Bronzes likewise are of varied composition. 88% copper, 10% tin and 2% zinc is the U. S. Naval specification, also called gun metal and Government bronze. Its great resistance to salt water corrosion makes it especially important in marine work. Bronze is also a bearing metal of wide usage, a composition of 80% copper, 10% tin and 10% lead being quite widely used. Phosphor bronze, varying from 89% copper, 10% tin and 1% phosphor copper to 94% copper, 5% tin and 1% phosphor copper, is valuable in chemical processes for valves and pumps and other parts calling for high resistance to acids. It is also widely used for cog and worm wheels, high speed bushings, slide valves, etc.

Battery of Four S. C. Gas-Fired Brass Furnaces.

Copper melts at 1981° F, with the brasses and bronzes all melting at lower temperatures as their composition varies, ranging down to around 1600° F. Pouring temperatures naturally run higher and range from 1800° to2400° F., with 2000° F., a good average figure. Most melting is carried on in crucible furnaces, although reverberatory furnaces are used for large scale production.

Crucibles are of two main types, the graphite and the silicon carbide.

The former is the least expensive in first cost but of less strength and shorter life than the silicon carbide type. Crucibles are sized by numbers, the number multiplied by three giving the pouring capacity in pounds of brass. In the usual small foundry No. 68 and No. 80 crucibles are the most common, particularly for stationary furnaces, as such a crucible holds about as much weight as two men can conveniently handle by tongs in removing it from the furnace for pouring. When mechanical means of handling the crucibles are available or a tilting type furnace is used, No. 100 and No. 125 are common. All crucibles are somewhat greater in height than diameter with a slight bilge. Their cost represents one of the major items of melting expense.

In this connection it might be well to emphasize the fact that fuel cost alone is not the sole criterion of the economy of a particular fuel. Just as in galvanizing practice (AMERICAN GAS JOURNAL, June, 1938) where we found two factors, pot life and dross formation (metal loss), represented costs of the same magnitude as the fuel, so likewise in the melting and alloying of the brasses and bronzes, we find that crucible life and metal loss demand especial consideration. The following data prove this point quite nicely, since it enabled us to convert the entire six furnaces of this plant from oil to gas, although the cost of gas alone was greater than the cost of oil alone. This plant produced an 88% copper, 10¼% tin,and 1¾% nickel alloy for the manufacture of ring gears. The furnaces were of the tilting type with No. 125 crucibles. The charge consisted of sheet metal briquettes, heavy scrap, screws, gates, and risers. Pouring temperature was 1900°-2000° F. Conversion to gas firing was made by means of a low pressure inspirator set and a tunnel burner with a 2-5/16" nozzle:

Standard S. C. Rated Crucible Furnace, with S. C. Automatic Proportioning Low Pressure gas burner equipment.

A saving in crucible life following a change from oil to gas is the usual thing. With gas firing it is easy to maintain the very slightly reducing flame that is necessary to preserve the crucible. An oxidizing flame eats away the plumbago and shortens its life. With oil firing it is rather difficult to hold the proper flame, particularly as it is always two valve control and the responsibility for the correct adjustment is thrown on the operator. The gas flame itself seems to be softer and exerts less of an abrasive action than does the oil flame.

Reduction in metal loss is often another direct result of changing from oil to gas, and is likewise to some extent associated with the character of the flame. An oxidizing flame is to be avoided at all costs. Of course certain of the metals used in the making of alloys are themselves rather volatile at the temperatures involved. Thus the metal zinc boils at approximately 1670° F., a property used in its purification; and a great deal of skill has to be exercised in melting practice to avoid excessive losses. Metal loss, as indicated above, is apt to be the greatest item of expense of the entire melting process.

At this time the importance of maintaining the furnace lining in good condition should be mentioned. Special highly refractory linings are used in the better type of brass furnaces, as ordinary firebrick does not stand up under the severe heating conditions. Even these linings, however, gradually wear away; and with this wear the efficiency of the furnace falls rapidly. Tests repeated at intervals in one of our local brass foundries gave varying results, with the highest efficiencies always following directly after a relining. A faulty lining also adversely affects crucible life.

In recent years there has been a trend towards the use of insulating fire brick linings, and the tests reported (Industrial Gas Magazine, April, 1936) show an appreciable saving in gas consumption so realized.

The discussion above has dealt mainly with oil competition; and a word on the coke fired brass furnace, the so-called "pit furnace," would not be amiss. Such furnaces are installed below floor level with the top of the crucible just about at floor level. The coke burns on a grate below the crucible. A chimney of exceptionally good draft is essential. Their disadvantages are slowness of production, difficulty of keeping a good fire, dependence on atmospheric conditions for good combustion, their general messiness and the poor working conditions that they introduce. The arguments for gas are reliability, speed, and better working conditions. Heats come out in nearly half the time entirely independent of the weather outside, the workman

	Gas Firing	Oil Firing
Total hours operated	8 hr. 40 min.	9 hr. 30 min.
Total metal charged	3150 lbs.	2450 lbs.
Total metal poured	2991 lbs.	2313 lbs.
Skimming and metal loss	159 lbs	137 lbs.
Per cent metal loss	5.05%	5.60%
Total heats pulled	9	7
Pounds per heat	350	350
Total fuel consumed	8120 cu. ft.	45 gallons
Ave. time per heat	44 min.	1 hr. 9 min.
Ave. fuel per heat	902 cu. ft.	6.44 gals.
Fuel per 100 lbs. charged	258 cu.ft.	1.835 gals.
Increase in production over oil	258 cu. ft.	
Comparative Costs		
Per 100 lbs. metal	@ 60c/M.C.F.	@ 7.5c/gal.
Fuel	15.48 cents	13.83 cents
Auxiliary power	.18	.18
Labor	25.00	25.00
Furnace lining	1.00	1.00
Metal loss	96.00	106.00
Crucible expensive	9.65	12.30
Total	147.31 cents	158.31 cents
Saving per 100 lbs.	11. cents	
Ave. life of crucibles	37 heats	29 heats
Increase in life of crucible	27.6%	

Note:—900 Btu mixed gas. Actually a labor saving, but not credited above. Likewise a saving in lining cost, but negligible as compared to other savings.

does not have to be an expert fireman and he works in a much improved atmosphere. A shop with any production or operated by an up-to-date manager will not hesitate long about replacing coke-fired pit furnaces when properly acquainted with the advantages of gas.

Industrial gas literature gives considerable data on gas consumption for brass melting. The summary of the New England Gas Association as given on page 192 of the 1938 American Gas Journal Catalog and Handbook is exceptionally good and agrees closely with our experience. It is especially valuable in pointing out the factors that influence the gas figure and the allowances to be made with changing conditions.

local plant, and also a 50-50 nickel copper which is used widely to introduce nickel into other alloys. The furnaces used were standard brass melting furnaces equipped with an oversize burner and conventional low pressure inspirator sets. No. 70 silicon carbide crucibles received a charge of light scrap, such as sheet clippings, wire, and forging flash. Pouring temperature was between 2400° and 2600° F.

The temperature here of 2400°-2600° is lower than that used in casting, where 2800°-2900° F. is customary, with a very marked increase in gas consumption over the above. Temperatures of this magnitude approach the ultimate for gas. The available heat has diminished to a low figure; and a long time is required for each heat, as well as a high gas consumption.

Tilting type crucible furnace such as used in iron melting.

The following table was based on the following assumptions:
First—Melting of solid metal
Second—Eight hours' operation per day
Third—Minimum of eight heats per day
Fourth—Gas having 530 B.t.u. content

Composition	*Pouring Temperature*	*Cubic Feet Per Lb.*
Phosphor bronze 94-5-1	2300	4
Eighty-five three fives 85-5-5-5	2200	3
Medium brass 80-20	2100	3
Yellow brass 65-35	2000	3
Copper nickel zinc alloy 64-18-18	2600	5

Nickel

The melting of nickel by itself is rather of isolated importance; but in its most common non-ferrous alloy, namely, monel metal, of quite widespread importance and can properly be discussed here. Monel metal is of the following composition: 67% nickel, 28% copper, 2% iron plus small amounts of manganese, silicon, and carbon. It occurs in nature in an ore of that proportion, and is refined by roasting to form the oxide and then reduced to the metal given above. Its silvery appearance, high resistance to all types of corrosion, and good working properties have given it a wide usage. The following figures cover its melting in a

Cast Iron

Admittedly the melting of cast iron is most economically done on a production basis by means of the conventional cupola. There are times, however, as discussed in the first of these articles (American Gas Journal, January, 1938), when but a few hundred pounds of iron is necessary for a rush order on a day when the cupola is not in operation. Then again many grey iron foundries are producing small heats of alloy cast iron, sometimes with elements that can not be added in the ladle with proper results. In these cases a tilting type crucible furnace, large enough to hold a No. 225 crucible, solves the problem in a most economical way. Where the alloy is to high in nickel or chrome, the usual silicon carbide crucible is coated on the inside with clay or cement, or a special alumina lined crucible employed.

Furnaces of this type will handle a 500 pound charge, producing the first heat in some three hours, with successive heats requiring but two hours (so reported). In a local test we found the first heat took 3½ hrs. and the second 2 hours 45 minutes. The first heat required 4500 cubic feet, or 9 cu. ft. (900 Btu gas) per pound. The second required but 3500 cu ft or 7 cubic feet per pound. The somewhat higher temperature (2900° F.) perhaps accounts for the difference in time and gas consumption with the results reported for Cincinnati.

Alloy	**Nickel-Copper**	**Monel Metal**
Composition	**50-50**	**67% Ni**
Time operated	**9 hrs. 26 min.**	**10 hrs. 5 min.**
Metal melted, lbs.	**1000**	**1010**
Number of heats	**5**	**5**
Gas cons (900 Btu)	**8250 cu. ft.**	**8650 cu. ft.**
Gas cons, cu. ft./lb.	**8.25**	**8.57**
First heat-time	**2 hrs. 29 min.**	**3 hrs. 10 min.**
gas cons.	**3220**	**2800**
gas per lb.	**16.1**	**13.85**
Minimum heat-time	**1 hr. 24 min.**	**1 hr. 20 min.**
gas cons.	**1100**	**1300**
gas per lb.	**5.5**	**6.43**
Average heat-time	**1 hr. 53 min.**	**2 hr. 1 min.**
gas	**1630**	**1730**

The Precious Metals

Of the precious metals, (silver, gold and platinum, only silver is commercially melted on a scale of any magnitude. Silver melts at 1761° F. having a heat in the liquid at this temperature of 152 Btu per pound. Hence its heating requirements are close to those of yellow brass, and similar burner equipment and melting practices are suitable, making allowance, of course, for the greater value of the product.

Gold melts at 1949 but holds but 92 Btu per pound in the liquid at that temperature. Its melting offers no difficutlies, although the scale of operation is generally quite small and the value of the metal such as to de-

(Concluded on page 50)

Portland's Unique Adaptation of Steam Accumulator

by
Henry W. Young
Portland, Ore.

A NOTEWORTHY improvement has been made in connection with the steam plant of the Portland Gas & Coke Co., Portland, Ore. This consists of a Foster Wheeler Corporation steam accumulator, designed for working pressures up to 200 lbs. per sq. in.

The function of this equipment is unique. It operates here to even off intermittent peaks in the rate of steam generation. The ordinary application of such an accumulator is to smooth out the curve in the consumption system. Also, this accumulator operates at much higher pressure than most of those found in gas works.

Recently installed steam accumulator at the Gasco plant of the Portland Gas & Coke Co. The pressure regulating valves are located inside the building on a balcony at about the point where the pipe is seen to enter.

As E. L. Hall, vice-president and chief engineer, explains it, the major part of all the plant's steam requirements is generated by waste heat boilers, operated in connection with the gas generators, the operation of which in turn is intermittent. Steam production is, therefore, subject to wide variations. The accumulator here installed takes this fluctuating output of the boilers, stores the excess, and permits consumption to take place at constant rate without any great variation in pressure.

For processing purposes in the by-product plant, and for general purposes, steam on the consumption side is utilized in a dual system, at 100 lbs. and at 180 lbs. Before the installation of the accumulator, because of the extremely varied rate at which the waste heat boilers produced steam, problems arising on the consumption side were numerous and perplexing. Although adequate in total amount, production would vary from almost nothing to full capacity. Now, in so far as consumption pressures are concerned, the accumulator has changed all that.

The tank of the accumulator is 8 ft. in diameter by 38 ft. long, made of 25/32 in. steel, with fusion butt welded joints of 90% efficiency. It is built for a working pressure of 200 lbs. per sq. in.; 1,025 lbs. bursting pressure; and subjected to 400 lbs. hydrostatic test. All joints were photographed and stress relieved at the factory.

In operation, the accumulator is actually about 90% full of water. During periods of high steam generation, excess steam from the waste heat boilers is fed into the water, raising the temperature. At peak working capacity, the accumulator carries a pressure approaching 200 lbs. per sq. in. and the temperature rises to about 370 degrees F.

All the requirements of the 100-lb. consumption system are fed from the new steam accumulator. The 180-lb. system is supplied directly from the boilers. Any deficiency in the steam output from the waste heat boilers is made up from the fuel-fired boilers in the plant power house. These feed into the same header as the waste heat units.

Operation of the system is automatic, through a series of pressure regulating valves. These have all been centralized at an overhead station in the steam plant, with a full complement of indicating and recording instruments on a single board on the main floor, under the observation of the station operator.

Partlow Temperature Controls
ATTENTION
Printers — Newspapers

PARTLOW

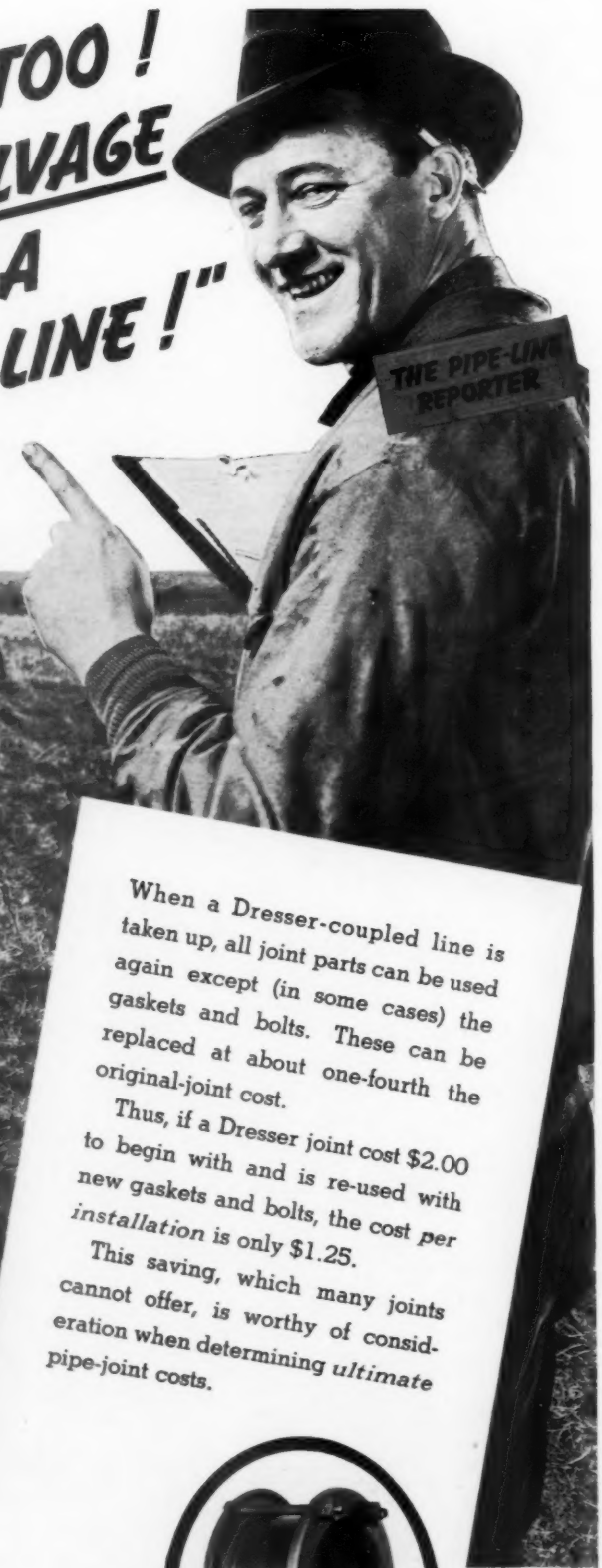
Partlow Temperature Controls Indicate as well as Control the temperature of your molten metal, which insures uniformity of slugs, plates, etc. Whether you use gas or electric heat on your composing machines or melting pots, we can cut the cost of fuel and maintenance to a minimum as well as improve the quality of your work.

A postcard will give you all of the information without obligation.

Let one of our representatives show you something of real interest and value.

The Partlow Corporation
New Hartford (Suburb of Utica), New York
Offices in Principal Cities.

"SOMETHING ELSE, TOO! THEY CAN EASILY SALVAGE THE JOINTS ON A DRESSER-COUPLED LINE!"



When a Dresser-coupled line is taken up, all joint parts can be used again except (in some cases) the gaskets and bolts. These can be replaced at about one-fourth the original-joint cost.

Thus, if a Dresser joint cost $2.00 to begin with and is re-used with new gaskets and bolts, the cost *per installation* is only $1.25.

This saving, which many joints cannot offer, is worthy of consideration when determining *ultimate* pipe-joint costs.

Only the gaskets and bolts, the least expensive parts, had to be replaced when reclaiming and relaying this Dresser-coupled line in Kansas.

NOTE TO READER: This is the twentieth in a series of advertisements dramatizing one engineer's experience with his first Dresser-coupled line. For the complete story, write for Bulletin 381.

DRESSER

MANUFACTURING CO., BRADFORD, PA.

In Canada: Dresser Mfg. Company, Ltd., 60 Front Street, West, Toronto, Ontario

Economic Trends and Their Effect Upon Coal vs. Oil for Making Gas*

By
W. S. Blauvelt
Hudson Valley Fuel Corporation

AS THE delivered cost per B.t.u. of residual fuel oil is now less than the corresponding cost of gas making coal at North Atlantic ports, it is timely to consider the economic trends which in the long run will determine whether coal or oil should be used for making gas. These trends depend upon three variables:

1. The relative available known quantities in nature's storehouse of the two resources—coal and oil.

2. The relative technological development of:
   a. processes for recovering oil and coal from their natural deposits;
   b. methods for transporting coal and oil;
   c. processes for the conversion of oil and coal into gas;
   d. processes affecting the market for oil and coal products, other than gas.

3. The relative effects of legislation and administration, federal, state and local, upon the total cost per therm of coal gas and of oil gas at the gas manufacturing plant.

Relative Known Available Quantities of Coal and Oil

Twenty years ago it was generally believed that the reserves of oil in the earth were so limited that annual consumption would necessarily be curtailed within a decade. History has disproved this belief. "Recoverable oil reserves have been trebled since 1925. In that year the reserves of the country were estimated to total 5,323,000,000 barrels. Since that date the nation has produced 11,303,718,000 barrels and today the estimated known reserves are 15,507,268,000 barrels."[1]

While it is true that the productive period of our coal fields with probable rates of mining is measured in centuries as compared with decades for our oil fields, the slogan "Eventually, why not now?" is not practically applicable. Known reserves of oil are believed adequate for all anticipated consumption demand for at least twenty years.

Relative Technological Development

Progress in the art of bringing crude petroleum to the surface during the past twenty years has been far more rapid than in the older art of coal mining. That future technical progress in reducing the cost of producing oil will be at least as great as in mining coal appears probable.

Notable technological progress has been made in the railroad transportation of coal; probably the total cost in man hours per ton mile is now less than half the comparable cost thirty years ago. It may be questioned whether as great progress has been made in the transportation of oil by pipe lines during this period.

Probably technological progress in water transportation, loading and unloading cargoes, has proceeded at similar rates for both fuels. There appears little prospect of improvements in transportation methods that will materially affect the relative costs of coal and oil at destinations near the Atlantic Seaboard in the near future.

Technological progress has been more rapid in commercial methods of making gas from coal than from oil during the past thirty years. Until recently, in most places where gas was manufactured in quantities, coal cost less than oil on a heat unit basis and in many places where oil was the cheaper gas making material, natural gas was available. Also the residuals, coke, ammonia, tar and light oils were marketable at prices which, in some cases, provided enough revenue to pay for the coal and all conversion costs. Hence, there being no great incentives, comparatively little work was done to develop commercial processes for making base load gas from oil. Substantial progress was made in developing the carburetted water gas process to use the cheaper residual oil and to use more oil and less generator fuel when price relations made this profitable.

Technological developments in other fields have profoundly affected the coal gas industry.

Improvements in the preparation of anthracite and the development of mechanical stokers for domestic use, have helped anthracite to hold its competitive position compared with coke. The development of automatic oil burning equipment has also made inroads into the coke market. These developments have had more effect to date in preventing the price of domestic coke from advancing to cover the increased cost of coal and of its conversion into gas and coke, than in reducing the tonnage sold.

The development of the atmospheric nitrogen process has reduced the price of sulphate of ammonia about 60% although the cost of the acid used has advanced.

Developments in petroleum technology are reducing the revenue from light oils.

For ten years or more we may expect a lower cost of oil than of coal, on a B.t.u. basis, in many places where gas is made in large quantities; in view of this fact combined with the reduced revenue from coal gas residuals, will not technical research be stimulated to develop commercial processes for making gas from the cheap residual fuel oil? Such processes when developed will tend to replace coal gas processes. That a process can be developed for completely converting residual fuel oil into gas suitable for general distribution, with an over all efficiency of 80% seems not only possible, but probable. The capital investment and the labor employed to operate and maintain such a plant might both be less than one-third as much as in a coal gas plant.

Effects of Legislation

As the known reserves of coal vastly exceed the known reserves of oil, a wise conservation policy would establish economic conditions favorable to the use of coal rather than oil, for all purposes where either could be used to produce the desired results.

Unemployment—idle men—is the most acute political and economic problem now facing us; probably at least three times as much labor is employed in producing, transporting and converting coal into gas as is re-

* *Part of paper read before The New England Gas Association, Operating Division, Boston, Mass., January 20, 1939.*

[1] *E. O. Thompson, Interstate Compact Chairman —quoted in N. Y. Journal of Commerce, November 25, 1938.*

quired for the production, transportation and conversion of oil into gas; the economic environment established by legislation should be such as to encourage the use of coal rather than oil for this purpose.

Idle capital* and the notable reduction in the rate of its production, presents a problem actually, though not yet politically, as serious as that of idle men; unemployment in the industries producing capital goods is more serious than in those producing consumption goods; hence legislation should not punish but should encourage capital investment. When capital can be safely invested in productive enterprises with a reasonable hope of a fair return, capital investment will increase, more men will be employed, more goods will be produced, and "the more abundant life" for all will at least be made possible. A far greater investment of capital is required for the production, transportation and conversion of coal into gas than is required for the production, transportation and conversion of oil into gas. Hence legislation should not increase the risk and reduce the possible reward for the thrift, enterprise and assumption of risk involved in the production, transportation and conversion of coal into gas. On the contrary, wise legislation would repeal those laws which now increasingly handicap the use of coal in its competition with oil for gas making.

Three kinds of law tend to increase the cost of coal gas more than the cost of oil gas, and the failure to enact another kind of law in conformity with sound economics and ethical principles has the same effect.

1. We have passed laws taxing labor products and incomes derived from productive service; we have imposed specially heavy taxes on capital investment—the tools of production; all these taxes have been imposed and are now being increased in utter disregard of the undeniable fact that such taxes increase the cost of living, reduce production and the purchasing power of those engaged in productive industry, and thus reduce employment.

2. Under the guise of Liberalism, falsely so called, numerous "reforms" have been enacted. We have passed laws which vainly attempt to increase the wages of all labor by arbitrarily increasing wage rates per hour and limiting the hours of productive labor; as though by producing less the producers would have more! In this class is all the so called "security" legislation. In olden times, it was said: Put not your trust in Princes; this might be modernized: Put not your trust in Political Royalists.

3. Laws which curtail free competition and substitute political control of business conduct.

Price regulation under the Bituminous Coal Act apparently is particularly hard on the Coal Gas industry. Probably no other industry buys so large a tonnage at so uniform a rate, regardless of the season of the year, or of variation in general industrial activity. Tonnage, uniformity in the rate of shipments, and the nearly complete elimination of selling expense and of credit risk, tend to reduce the producer's unit cost on such business and the average unit cost of his total output. In a free market the producer's cost reduction due to these causes tends to be shared with the cooperative buyer. It appears probable that no reduction from the minimum prices to be established by the Commission will be permitted; this is another case where legislation interfering with the beneficent results of natural economic law in a free market, may further increase the cost of coal for making gas.

But the cost of coal at the mines even now is only 50% to 65% of the freight charges to Eastern gas manufacturing destinations. From 1907 to 1936, freight tariffs were increased from 66% to 88%. The Clearfield rate to New Haven advanced from $2.25 to $3.24—66%; the Clearfield rate to New York advanced from $1.85 to $3.37—82%; and the Pittsburgh rate to New York advanced from $1.92 to $3.62—88%.

No figures are available covering the generally increased cost of conversion of coal into gas. In one plant from 1928 to 1938 average wages paid per hour worked increased 13½%, but total taxes per ton of coke manufactured increased 322%; this compares with an increase of 334% from 1907 to 1936 in the taxes paid by the railways per ton of freight carried.

Doubtless the cost of producing, transporting and converting oil into gas has also been materially increased by various laws. But as less capital and less labor is required to manufacture oil gas than is required to manufacture coal gas, the political handicap on oil gas is lighter than it is on coal gas.

*"Capital" as used herein means wealth saved, risked and used to produce more wealth. "Wealth" means all material things having exchange value, produced by human labor.

Two Hundred Gas Company Employes Trained to Aid in Artificial Respiration

A far-sighted public relations policy of the Michigan Consolidated Gas Co., Grand Rapids, Mich., has resulted in the training of nearly 200 regular employes to serve as an auxiliary to the Grand Rapids police and fire departments and the Kent county sheriff in cases of drowning, asphyxiation or shock produced by contact with high voltage electric currents.

These men form the source material for the inhalator squads of the gas company. Three of the regular company trucks, fully equipped with short wave radio and ordinarily used for night service calls and to release pressure on the regular force in day hours, have inhalator equipment available. Two carry this equipment as part of their service kit. Day and night they stand ready for emergencies. They are constantly in communication with fire and police departments, via the police radio.

Twenty Times a Year

The inhalator apparatus actually is used on an average of 20 times a year, according to John Heydenburg, service department foreman. In one out of four cases the squad is successful in reviving the victim.

Actual inhalator training has been given 50 of the regular company employes under the direction of George Ludwig, department head, and Heydenburg. More than 150 others are proficient in the use of the Schaeffer method of artificial respiration, a necessary supplement to the inhalator.

The modern method of artificial resuscitation—the inhalator—is not, like the pulmotor, a mechanical device for forcing air in and out of the lungs, according to Ludwag.

When the Schaeffer method of artificial respiration is used, the lungs are pressed in, then allowed to expand. By means of a gas mask over the face, the inhalator feeds in a mixture of carbon dioxide and oxygen. The 5 per cent of carbon dioxide acts as a stimulant to breathing while the oxygen provides five times as much oxygen as the patient could take in a breath of ordinary air. Thus it greatly hastens recovery and the return of consciousness.

One of the gas company cars answers every fire alarm, day or night, and frequently gives firemen valuable assistance. The police have one inhalator in a police ambulance but occasionally take advantage of the gas company's service. Frequently the gas company squad responds to calls from the sheriff's department to aid in attempting to revive victims of drowning accidents.

Public Service E. & G. Co. Extensions

Principal among improvements planned for the Gas Department of the Public Service Elec. and Gas Company, Newark, N. J. is increasing the generating capacity of Central Gas Works at Raritan from 4,000,000 to 10,000,000 cubic feet daily. This will provide an increased gas supply in the Central Division and part of Essex Division of the Company's territory.

A 24-inch gas main will be built from Belleville to Montclair, to reinforce the supply not only in Montclair, but in Bloomfield, Glen Ridge, Verona and the Caldwells.

Howle Economical Gas Heaters* for Small Homes and Flats

Howle Gas Fired Heaters initiate a new field of selling endeavor in a market that is economy yet luxury conscious. Now small homes and flats can have the comfort and convenience of even, circulating radiant heat, day and night, **at amazingly low cost.**

Think of the selling points: clean, no dirt, no work, no coal to shovel, no ashes to lug. Howle Heaters take the low cost heating rate and you don't have to pay until after the fuel is used.

Check the construction features below. See why Howle Gas Fired Heaters are gaining such rapid consumer preference.

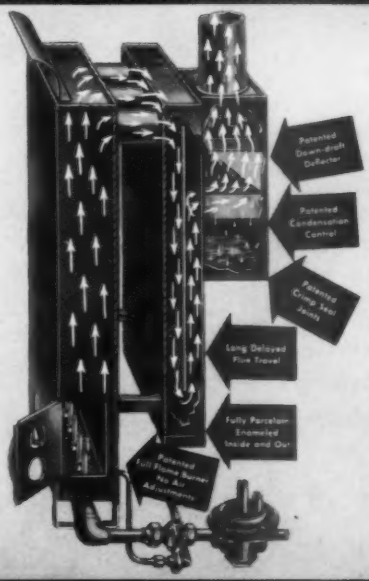
***With or without automatic control**

IN THREE EFFICIENT ATTRACTIVE SIZES

Vastly improved Armco enameling stock iron construction, full vitreous porcelain enameled throughout and corrosion proof (even against salt atmospheres). Finished in blended wood tones to harmonize with room furnishings.

MODEL	INPUT RATING	DIMENSIONS
A-30	30,000 B.T.U's	18x18x41
A-45	45,000 B.T.U's	18x22x44
A-60	58,000 B.T.U's	18x26x47

LOOK AT THE INNER UNIT CONSTRUCTION OF THE HOWLE GAS FIRED HEATERS . . . .

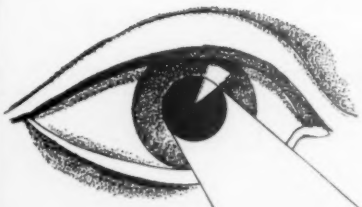

Patented Down-draft Deflector
Patented Condensation Control
Patented Crimp Seal Joint
Long Delayed Flue Travel
Fully Porcelain Enameled Inside and Out
Patented Full Flaming Burner Mix-Air Adjustment

GAS ACTUATED CONTROL

with all the inherent advantages of electric control, plus built in safety pilot protection. The control valve and safety pilot are both contained within the jacket of the heater, away from any possible damage or danger of tampering by children.

WRITE FOR ILLUSTRATED FOLDER & COMPLETE INFORMATION

THE HOWLE COMPANY 335 SOUTH WESTERN AVENUE CHICAGO ILLINOIS



A NEW SALES APPROACH *thru* EYE APPEAL

The New Way to increase your Automatic Gas Water Heater Volume. Selling through *Vision* and conversation. You'll be surprised how easily it works.

A SALES CAMPAIGN

DESIGNED TO SELL ANY MAKE OF AUTOMATIC GAS WATER HEATER

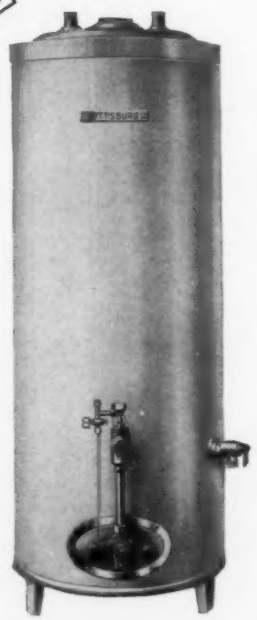
I've made up my mind
No matter what it is
I am not going to listen
What's that hot box there?
Why that's interesting
Say — that's just what I need
I'm glad you showed me that
"You may make a survey and we will install a Pittsburgh"

The Sales Maker In Action. You will marvel at its appeal.

"Sales Maker"—a Book of attractively illustrated pages—with easel—in a genuine cowhide zipper binder. Each sheet pictures a universal use of Hot Water—a new sales approach based on scientific selling—these pictures hold attention . . . create interest and the desire to own an Automatic Gas Water Heater.

"Sales Planner"—a training course that will make your sales organization *click!* A positive *HIT*. It helps your Supervisors to help your Salesmen, and too, will increase their earnings, as well as yours.

"Sales Finders"—a complete array of Sales Promotion Literature consisting of a *Mailing Campaign* of 14 attractive mailing cards. *Folders and Enclosures*—a series of attractive folders that create interest and keep the prospect's interest alive between your salesmens calls. *Newspaper "AD" Service*—a new series of eye catching, human interest newspaper advertisements in various sizes to meet your requirements.



Send for complete campaign NOW — and put it to work

Pittsburg offers the most complete line of laboratory tested and approved Automatic Gas Water Heaters to meet every Hot Water demand.

PITTSBURG WATER HEATER CORP.
PITTSBURGH, PENNSYLVANIA

The Worcester Combination Kitchen and Hot Water Heater

A New Appliance in a New Field

By
R. J. Rutherford
Vice President
Worcester Gas Light Company,
Worcester, Mass.

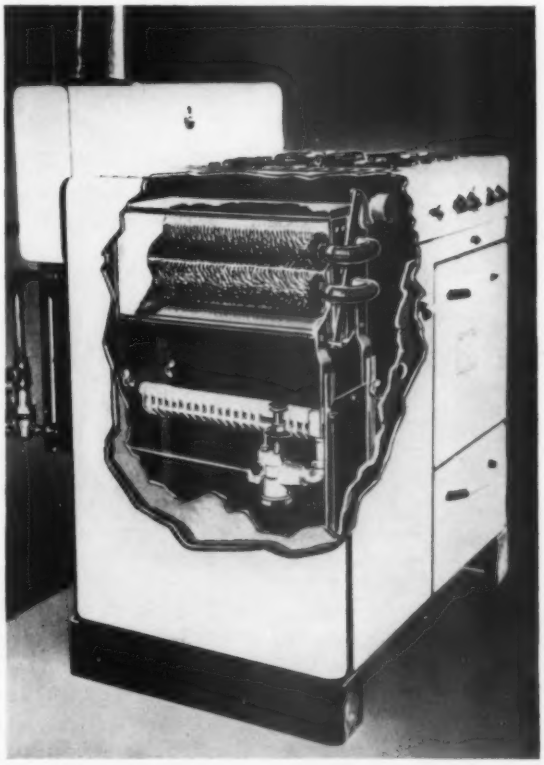
R. J. Rutherford

THERE exists in many locations, an appreciable market for the heating of kitchens, and tenements from the kitchen, which is today generally untapped for gas. New England affords a good example where this market represents as high as 53% of the domestic dwellings. In every territory, undoubtedly, some of this business is available.

At present this service is supplied by either oil or coal and never having been on gas, its potentialities go unrecognized. As an example, in one New England territory where detailed market studies have been made this field if saturated with gas equipment would more than double the present domestic revenue. This study shows that out of 47,000 dwellings, 23,500 are potential users of gas for this service at an average increased revenue of $60.00/yr., the present total domestic revenue being about $1,000,000/yr.

The market, however, is directly competitive on a cost basis and consequently requires rates nearly equal to competitive costs. However, these costs are such that they present to the gas company an opportunity to sell gas at a price upon which a return is possible, and at a price the consumer is already paying, hence is willing to pay. Rate designs are already in operation which permit developing this market at no loss to existing revenues.

The studies referred to above further show that in order to obtain a real share in this market not only space heating must be provided but gas will have to do the cooking, baking and water heating as well if it is to replace coal or oil.



Combination Kitchen and Water Heater

Existing gas devices are available for providing comparable service for heating and cooking operations but water heating presents a new and entirely different problem. The most satisfactory and accepted means of water heating in this market when a range oil burner is used is with a water coil around it, or, when coal is used, a water front.

Therefore, to fully develop this market a new type of gas water heating device is necessary. One that would give comparable service to the accepted competitive methods. Such function the Worcester Water Heater performs.

This unit includes a standard kitchen heating burner adapted to the dual function of space heating and water heating. Fundamentally, the unit itself also performs the functions of two accepted methods of water heating, namely, in winter, service such as is obtained from a range oil burner and coil, and in summer, service such as is obtained from a gas stack or tank heater.

Described before The New England Gas Association, Operating Division, Boston, Mass., January 20, 1939.

A detailed explanation can best be given by referring to the accompanying illustration. This shows the complete unit installed in the fire pot end of a utility type range. It could be similarly installed in the fire pot of a coal or combination type range.

Essentially, it consists of three main parts. A special heat exchanger; the baffles; and burner; incorporated in the installation between the lower circulating pipe and the main gas supply is a oater thermostat which functions only as a limit control. Also, between the water thermostat and a by-pass type room thermostat is installed a gas cock.

The equipment also includes a safety piloet. The unit is equipped with adjustable legs for installing in varying depth fire pots.

The normal operation of the unit would be either summer or winter setting.

For summer operation, the room thermostat would be set for by-pass, the valve between it and the water thermostat would be used for turning on and off the burner. The baffles would be opened by manipulating the counterweight and linkage so that the entire flow of heat for the burner would pass up through the inside of the heat exchanger and vent under the cover, thence directly to the flue.

With this setting, the service and operation would be identical to that of the conventional gas tank water heater, but at higher efficiency. The water thermostat would operate in the event that the burner were not turned off, an added safety feature not provided on the ordinary tank heater.

For winter operation, the room thermostat is the master control. The cock between it and the water thermostat is left open and the baffles of the heat exchanger are closed. Thus, the heat from the burner would be deflected by the baffles to the surfaces of the fire pot and external surface of the heat exchanger.

With this setting, service and operation would be identical to that of the oil burner coil water heater. The new unit is so designed that with this setting the water thermostat would never operate because the temperature of the water, even with continuous operation of the burner, would not reach the temperature setting of the water thermostat. Thus, the room thermostat would always be in control when space heating is desired.

While these are the normal operations, obviously the flexibility of the unit is such that it can easily meet abnormal requirements for hot water any time in the year. It is only necessary to open the baffles and the fast recovery of the tank heater is available.

This unit incorporates the best features of the two existing and accepted methods of heating water in this market but does not include the objectionable ones. For example, the main objection to the oil burner coil method is that in summer, to supply hot water, it is necessary to heat up the already hot kitchen. With the Worcester Water Heater on summer setting, the water is heated with no sensible room heating due to the baffles and heat exchanger design.

The Worcester Water Heater is new and unique, it provides the missing answer to a complete solution for obtaining this vast new and profitable market of kitchen and tenement heating.

Service Proved ••• Rely On

"CLEVELANDS"

Years ago, "Cleveland" pioneered the compact, mobile, full-crawler trencher. Ever since it has devoted itself to making it better—more efficient—more reliable.

Today a large number of Cleveland "Baby Diggers" and Tamper-Backfillers are in constant service in the Gas Industry.

When it is a question of getting the most out of machine-trenching, you can rely on "Clevelands" to give it to you. Let us tell you why.

Cleveland built Trailers for all Models speed up transportation and increase utility. Machines load and unload in 10 to 15 minutes.

THE CLEVELAND TRENCHER COMPANY
"Pioneer of the Small Trencher"
20100 St. Clair Ave. Cleveland, Ohio

"CLEVELANDS" Save More — Because they Do More

TITAN WATER HEATER CONTROLS

AGA Approved TITAN Temperature and Pressure Relief Valve

This device is installed on the hot water outlet in the tank directly in the flow of water. Action, as a result, is unfailing and positive, there being no dead pockets to prevent proper functioning of relief valve.

Pressure relief is obtained through a spring-loaded valve which opens when the pressure reaches a predetermined point. Should the water become overheated to 200° F, a fusible disc melts and lets the water escape thereby preventing a further increase in temperature.

The Titan Relief Valve serves as a coupling connected in the line thereby eliminating the necessity and expense of a tee fitting. To replace fusible disc, it is not necessary to disassemble valves or piping in any way.

Designed for application to storage or range boilers. Prevents corrosion, scalding and explosion.

Catalog and full information upon request.

The Titan Valve & Manufacturing Company

Thermostats • Safety Pilots • Relief Valves • Safetystats
9913 Elk Avenue Cleveland, Ohio

CRUSE-KEMPER COMPANY

STEEL PLATE CONSTRUCTION

AMBLER, PA.

GAS HOLDERS

HOLDER INSPECTION

RIVETED OR WELDED FABRICATION & ERECTION

TANKS, BINS, FLUES PURIFIERS, WELDINGS

HIGH GRADE

Gas Stops

Factory inspected and guaranteed for ease of operation and freedom from leakage. *Catalog on request.*

G-493—Tee Head Roundway High Pressure Gas Stop

KITSON COMPANY

2409-15 Westmoreland Street • Philadelphia, Pa.

Manufacturers of Kitson Safety Devices (Lovekin Patents) for Domestic Water Heaters . . . Quality Brass Goods for Gas, Water and All Plumbing Uses

PRESTIGE or PROFIT IN 1939?

No doubt you have a very good reason for not permitting 70% of your customers to enjoy automatic water heating.

After all it would not do to advance living standards too rapidly among the common people.

By rigidly confining your sales activity to the upper 30% you can really deal with some very nice people and at the same time keep the furnace-coil load safe for the coal industry.

However, if you are in business more for profit than for prestige you might want to know about a plan of waterheating sales that has added

1,000,000 therms

to the yearly load of one utility of moderate size.

AUTOGAS CORPORATION

Chicago, Illinois

General Sales Agent
Republic Heaters Sales Co.
Chicago

Experiences with Gas Range Regulators and Gas Range Filters

By

W. H. Hanson

Providence Gas Company

EVERY gas range that is taken from the stock of our company for installation in a customer's home is equipped with a governor to control the pressure at three and one-half inches. However, we feel that the installation of a governor, as a means of giving the customer satisfactory service from the day of installation and of minimizing service costs to our company, is only a part of the story.

Every range on which these governors are installed passes through a Test Room before going to the customer. In this Test Room, fixed orifice spuds are applied and the rate of flow through each individual burner is carefully measured and adjusted to the predetermined point. This procedure, in considerable measure, accounts for the satisfactory operation of the range with a governor.

On the ordinary size range, where the fuel line is three-quarter inch, the governor is installed as close to the range as possible. However, on ranges of extra large capacity, such as six burner, three oven ranges, customers are apt to object to a large size governor in the kitchen, so we are following the practice of installing such governors on the fuel line in the basement. We have not had complaints on the installation of the smaller size governor at the point where the range is located.

One reason for starting this practice was that a check-up of ranges in the homes of Appliance Service Men, where of all spots, we might expect to have good adjustment, indicated that the burners in some cases were over adjusted and in other cases under adjusted. It is interesting to note that on a check-up of a few ranges, which have been installed with fixed orifices and governors, in continuous operation since August, 1937, it was found that the pressures and burner ratings are today just as they were the day the range was installed.

The governor, which we are using, is of the full-shut-off type, so that, if, for any reason, there should be a radical drop in pressure or if the diaphragm is ruptured, the gas supply to the appliance is discontinued.

A paper read before the New England Gas Association, Operating Division, Boston, Mass., January 20, 1939.

During the year 1938, all service orders on ranges equipped with a governor were segregated from all other range service orders in our files. It is interesting to observe that, with approximately twelve hundred ranges in the field equipped with governors, we have been called upon to respond to only fifteen governor complaints, which, you will notice, is only about 1%. A breakdown of these calls shows that five were due to the governor vents becoming clogged, five were due to the governor sticking in operation, three required resetting, one was chattering and one was leaking.

It has been requested that the subject of filters be touched upon. We have installed about eight thousand filters in our territory since 1933. The particular type that has been used is made with a three-quarter inch opening and is so designed that the gas passes through a considerable amount of sheep's wool, having a two-inch cross section, with a maximum pressure loss of one-half inch, water column.

From our observations, the best results in controlling pilot stoppages on gas ranges are obtained by installing this filter as close to the range as possible. In our experience, it will collect a substantial amount of the dust, or pulverized rust, that is carried along in the gas stream, and which would otherwise be deposited on needle point valves, etc.

The filter is so designed that it may be serviced in the field and refilled with sheep's wool without removal from the fuel line. From time to time, we do remove these filters for examination, especially when they are located in some of the districts where the gas mains have been in service for many, many years. We have found such sample filters contain considerable rust, but, up to the present time, none has become so badly plugged as to seriously affect the flow of gas.

A study of our pilot outages indicates that pilot outages decrease as filters are added, so we may assume that with filters, as with governors, service to the customer is improved and service costs to the utility are decreased.

In summary, our Test Room locates defects and other shortcomings on gas ranges as they are received from manufacturers, and, as yet, we have found no manufacturer who is an exception to this unfortunate situation. It helps to assure to our customers satisfactory results from the first time the appliance is used, and the same results each day and at all times throughout the day. The installation of the governor and the filter also contributes toward this assurance of customer satisfaction. In our experience and from our observations, the Test Room, the governor and the filter combine to save service-after-installation costs that would otherwise have to be borne by our company.

A.S.H.V.E. Reviews Research in Air Conditioning, Heating & Ventilating

Research in air conditioning during 1938 contributed important new knowledge to the basic science of heating, cooling and ventilating, according to the annual review of the Committee on Research of the American Society of Heating and Ventilating Engineers.

Summing up the activity of the committee which, through its research laboratories in Pittsburgh and arrangements with scientific institutions, represents the cooperative effort of the industry to study fundamental principles, its chairman, Walter L. Fleisher, outlined the outstanding achievements of the year which he said would result in improved air conditioning practices and greater usefulness to the public.

Of particular importance, Mr. Fleisher declared, was a final determination of the range of temperatures and humidities necessary to provide optimum comfort to the public in summer air conditioning, following tests extending over a period of three years. Expressed in terms familiar to the layman, it was found that the majority of persons in any part of the country are likely to be most comfortable at temperatures between 75 deg. F. and 80 deg. F. with relative humidities from 30 per cent to 70 per cent.

Small Shop Gas Meter Maintenance

Mr. Budnick testing for leaks.

by

George L. Budnick

Superior Water, Light and Power Company
Superior, Wisconsin

THE proper procedure in the maintenance and repair of gas meters is, and always has been a much disputed question, with a wide difference of opinion. This is especially true in the small shops maintained by one or a few men.

Larger shops must naturally be organized and have a set routine to follow. That is, a meter comes in and it follows a regular course through the shop, each man doing his particular job on it. Although this method of handling meters has many wasteful disadvantages, it is the most economic way of inspecting and repairing a large number of meters. Thus, meter repairing in the larger shops is pretty well standardized.

While it is true the small shops, too, must be organized and follow a regular routine of meter handling, it would be far too costly to follow the routine of the larger shops.

One regular procedure that both large and small shops must agree on is the necessity of oiling diaphragms. They may differ only as to the length of time between such operations. This difference of time is an individual problem of each company, depending largely on the kind of gas used.

Every department head or shop superintendent wishes to maintain his shop as economically as possible. Very often the vitally important factors in meter repairing are sacrificed to gain this false economy.

All meters are not set in standardized locations; neither are they all used uniformly. One may pass its full capacity of gas for a given time while another may have been used only sparingly. It is only fair, then, to conclude that each meter is an individual job and should be given a repair procedure depending on its condition. Thus, a wide difference of opinion may arise as to what should or should not be done to a meter.

When a meter is brought into the shop, whether it be for routine inspection or for any other reason, it should leave the shop in first-class condition. As was stated previously, in the larger shop a meter goes through a regular routine of repair and leaves the shop mechanically correct. In the small shop, however, the extent of repairs to be made is left entirely to the judgment of the repairman. For example, a 60-light meter is brought into the shop for routine test. There being few or no other meters of this size in stock, it must be reset as soon as possible. The proof test shows a 3% error, slow or fast. The small error and urgent need for this meter tempts the repairman to send it back into service without further inspection or repairs. The result of such action may be very costly. The expense involved in removing and resetting this meter must be considered along with the ever-increasing error. The proper and most economical thing to do in this case would be to remove the top, locate and eliminate the reason for the error, thus returning a correct meter into service. In other words, if a meter is worth removing, it should be worth fixing before being reset.

The first requirement in a small shop, properly maintained, is a meter repairman with these qualifications: honesty, ability, and a thorough knowledge of gas meters and their care, combined with sound judgment. He must be honest with himself and the company, and have mechanical ability to do the various jobs that will confront him daily.

To this type of man the proof test of an incoming meter will partially show to what extent a meter must be repaired. On removing the top, by close inspection together with various tests, he will know definitely what must be done.

Following is an outline of the repair procedure which is used in our shop, which services approximately 8,500 meters. We are at present following the ruling of the Wisconsin Public Service Commission which provides that "Each gas meter shall be removed from service and tested at least once in every forty-eight months."

A meter on entering our shop is put into one of four classes:

Class A—Meters out less than six months.
Class B—Routine tests and repairs every four years.
Class C—Routine tests and repairs every eight years.
Class D—General overhauling when needed.

The repair procedure for each of these classes is as follows:

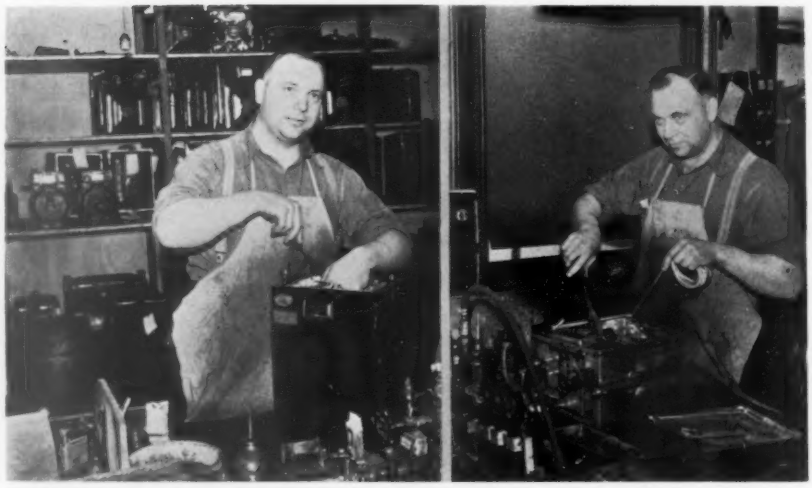
Class A—A meter in service less than six months, brought into the shop for any reason, is connected to the prover, put under pressure, closing outlet and inlet and observing the pressure gauge. If the gauge does not show a drop, the meter is tested for accuracy. If this test proves satisfactory, and there is no fluctuation in the pressure gauge, the meter is top tested, painted and put back in service. On failing in any of the above tests, or on being in service for four years, it falls into the next repair procedure.

Class B—The top is removed, the tangent revolved to try valve arms for wear, sticky or dirty valves, or binds. Assuming this test is satisfactory, the stuffing boxes are packed, flag arms divided, binds above the table eliminated, and bearings oiled. The meter is then put under pressure and submerged in water to locate any outside leak that may show up. After repairing leaks, if any, the meter is four-pointed or slow-lighted to detect any internal leak. On passing the above tests, the meter is adjusted, topped, top-tested, painted and put back in service. When it is necessary to remove the back plate for the purpose of locating an internal leak, or for any other reason, the meter falls into the next order of repair, which is routine every eight years.

Class C—After removing the back plate, the channels and partitions are examined and tested for leaks, the diaphragms are tested and if found to be tight, are oiled through the valve parts. The valve and valve seats are then ground. The valve arms, valve wrists, and crank shaft are checked for wear. After replacing worn parts and lubricating all bearings, the back plate is replaced and the same procedure is followed as in Class B. When a channel or partition leak shows up below the table, the cases are removed, the leaks made tight and cases replaced. When the diaphragms show a leak, the meter falls into a general overhauling procedure, or

Class D—which calls for removing the cases and diaphragms, cleaning out and inspecting the case (the case being rusted or obsolete, the meter is retired.) Diaphragms are replaced, the cases put on and the meter follows the same procedure as it followed in Class C.

General necessary repairs such as re-aligning tube screws, cleaning indexes, replacing broken glasses, tapping and draining drip and condensation, repairing case leaks and cleaning, are regular and accepted practice in this, as in all shops. Dating and telltale markings on the back plate tell the repairman definitely just what was done the last time the meter was in the shop.



Left:—Mr. Budnick engaged in packing stuffing boxes. Right: Installing Diaphragms.

The result of this system of meter handling in our particular shop has gone a long way in bringing about the ultimate aim of our Company; namely, more accurate tests on incoming meters and a longer period of service per meter.

Some of the "repair" practices which should *not* be permitted in any shop today are as follows:

Removing a top to adjust the error, without correcting the cause.

Slipshod methods, such as melting the tangent to fit binds and wear, pouring grease on packing box nuts in place of repacking, patching a leak instead of cleaning and sweating properly, oiling valve seats rather than grinding them.

These, along with other such practices, will surely end up with a lot of erratic, stopped, D. R., leaky meters which, if allowed to continue, definitely mean loss of revenue and early retirement.

One very important and very much neglected operation is the proper packing of stuffing boxes. To pack a box incorrectly is as bad as not packing at all. Improper packing of the center box or the neglect of packing it, is one of the outstanding causes of erratic and fast meters. Boxes not packed and allowed to run year in and year out with only grease poured on the nut to seal it, will soon wear the shaft beyond the point of packing. This condition causes fast, leaky, and troublesome meters, eventually resulting in costly repairs, frequent attention, and dissatisfied customers.

Although the meter shop is usually located in some out of the way place, the qualified repairman has his important place in making and keeping customer good will. One sure way of doing his part well is by doing his work right, thereby minimizing complaints and rebates on fast and leaky meters.

After all, there is only one way to repair a meter; that is, do it right, in all fairness to the customer, the company, and yourself.

SUPERIOR GAS METERS

For Sound Values and Continuous Operating Economy. Meters for Domestic and Industrial Use, All Sizes 5B to 60C.

Wet Test and Demonstration Meters
Diaphragms—Service Cleaners
Provers—Meter Repairs.

Superior Meters are built to A. G. A. specifications to provide complete protection against leaks and costly repairs. Write for details and quotations.

SUPERIOR METER COMPANY

167 41st Street ***Brooklyn, N. Y.***

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

METER REPAIR PARTS

FOR

ALL MAKES — ALL SIZES OF METERS

LARGEST GAS COMPANIES NOW USING OUR PARTS

SEND FOR OUR CIRCULAR ON METER REPAIR PARTS

SAMPLES AND PRICES GLADLY SENT

— 0 —

LAMBERT METER CO.

BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

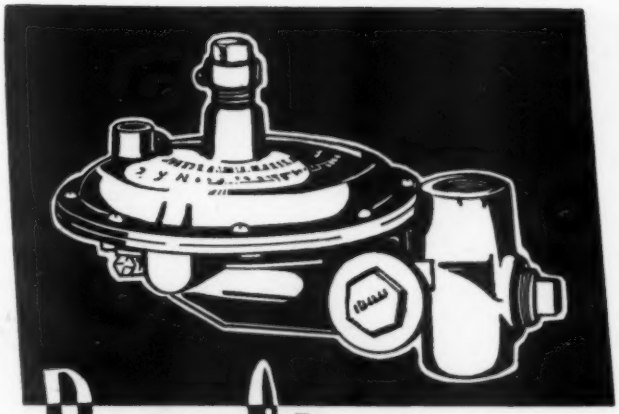
FOLKS LIKE YOU

You'll like the other guests at the Bismarck. They, too, enjoy and appreciate good food, unobtrusive service and restful rooms.

IN THE HEART OF CHICAGO

BISMARCK
HOTEL-CHICAGO

RANDOLPH AND LA SALLE



Results

. . . . . *are what determine successful Gas Control Performance*

REYNOLDS has more than forty-five years experience in the Gas Control Field, working out, designing, building and testing gas regulators, and the result: More than a million regulators in use throughout the world, meeting all requirements and giving successful performance.

REYNOLDS Service Regulators are built to meet the specific requirements necessary in service regulation. They are guaranteed to give the high quality of performance you demand over years of operation with a minimum upkeep. Below are a few characteristics of the different Models 10, 20 and 30.

MODEL 10

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal. All working parts are so accessible as to be interchangeable without removal from pipe line. Available with removable spring.

MODEL 20

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal. All working parts are so accurate as to permit complete interchangeability in shop.

MODEL 30

For Horizontal or Vertical connections, with or without removable valve pockets. Available with either Spring or Dead Weight adjustment. With or without Mercury or Dead Weight Safety Seal. Available with removeable spring.

GAS CONTROL SINCE 1892

REYNOLDS GAS REGULATOR CO

ANDERSON INDIANA U.S.A.

Gas Industry to Present "All-American" Home At New York World's Fair

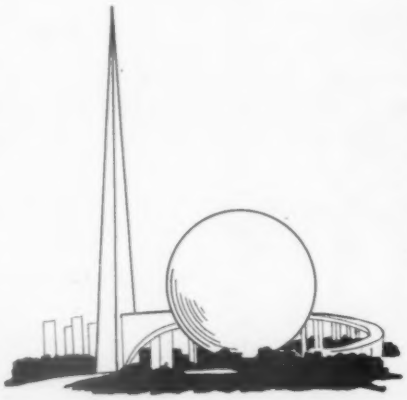
Above is the "All-American" home designed to embody the traditions of yesterday while aiming at "tomorrow's" living based on the average American's preferences, which will be part of the gas industry's exhibit at the New York World's Fair.

An "All-American" home to show visitors to the New York World's Fair how the typical American family may live "tomorrow," will be built by Gas Exhibits, Inc. as part of the gas industry's spectacular "Court of Flame" exhibit at the Fair. It will be done in cooperation with Good Housekeeping Magazine which will furnish and decorate it under the direction of Helen Koues, director of Good Housekeeping Studio.

In announcing the project, Hugh H. Cuthrell, president of Gas Exhibits, Inc., said: "The architectural inspiration for the house comes from a famous and thoroughly American prototype—an historic house outside of Baltimore, Maryland, called 'Homewood.' This famous post-revolutionary house was built by Charles Carroll, signer of the Declaration of Independence, for his son John, and embodies many architectural elements which Americans appreciate. Its over-all lines and dignified beauty have been retained in the modernized version. The modification of plan and exterior to meet present and future living conditions was done along lines determined by research into the preference of feminine America."

Planned as a feature of the gas industry's participation in the Fair, the house is being developed as a dramatic demonstration of what a house can be when the house heating, air-conditioning, water heating, refrigeration, cooking and laundry equipment are all powered by gas. It has been designed with the moderate income group in mind. The "All-American" home will be of white stucco, with roof, shutters and doorway in color. Its pillared portico will be "the type already familiar to Americans everywhere as the doorway to the White House and the homes of Washington and Jefferson." Of one story, it will have a dining room, living room, kitchen, four bedrooms, three baths and an extra lavatory, all with extra sized windows to conform to the modern demand for light and air. The tendency of the modern American family, say experts, is to live more and more at the back of the house, away from the street. Hence the wide windows of the living room open onto a terrace, where living can be done in the open as much of the year as possible.

The kitchen pantry and utility room have been designed to embody all the best techniques in home management.



An all-purpose room adjoining the kitchen will house the modern gas heating, air-conditioning and laundry equipment. The kitchen itself, together with a pantry, will provide plenty of working space while including all the step-and-space-saving devices the moderns have learned so well. The newest types of gas range and gas refrigerator will take care of food problems.

The collaborating architects were Dwight James Baum, noted architectural consultant for Good Housekeeping, and Skidmore and Owings, John Moss Associate, architects for the gas industry's exhibit group.

Reduced Railroad Rates to New York World's Fair

It's going to cost out-of-town visitors a good deal less than usual to come to New York by rail during the period of the New York World's Fair 1939.

Substantial reductions in passenger rates of all classes for distances greater than 250 miles from New York—30-day first-class round trips as well as 30-day round trip coach rates, and week-end excursion coach rates for distances as low as 50 miles from the city—have been fixed by the railroads' Trunk Line Association of New York, and by the Central Passenger Association of Chicago. The Southern, Western and New England associations and the Canadian lines have not yet held their formal meetings, but are expected to act shortly.

The reduced-rate first-class 30-day round trips will be sold only between June 1 and September 30; but the reduced day coach rates will apply from April 28 to October 28. The rate per mile, in each direction, for tickets valid in upper berths, will range from 2.69c for distances from 251 miles to 300 miles, down to 2.43c for distances over 950 miles. The rate for tickets valid in lower berths and chair cars will range from 2.98c per mile in each direction for distances between 251 and 300 miles from New York, down to 2.70c for distances over 950 miles.

The regular first-class fare of 3c per mile would apply for distances within 250 miles of New York City. The reduced first-class fares will apply going and returning by either the same route, or returning by certain diverse routes; and stopovers will be allowed at all stations on going or return trip or both.

Much greater reduction has been agreed upon by the railroads for day coach round trips good for 30 days, and for week-end day coach round trips; also still greater reductions for one-day excursions and for parties of 25 or more traveling together to the Fair by coach and returning either in groups or individually.

CARBONIZATION IN VERTICAL RETORTS

The modern Glover-West vertical retort plant has behind it the accumulated experience of sixty-four years' constant research and development for the advancement of gas production methods.

During that time we have built 430 plants for 230 different clients in twenty-four countries. This experience is built into every installation.

WEST GAS IMPROVEMENT CO.
424 Madison Avenue, New York

FULTON
Lever Safety Valve

Will Blow When Allowable Pressure Limit is Reached

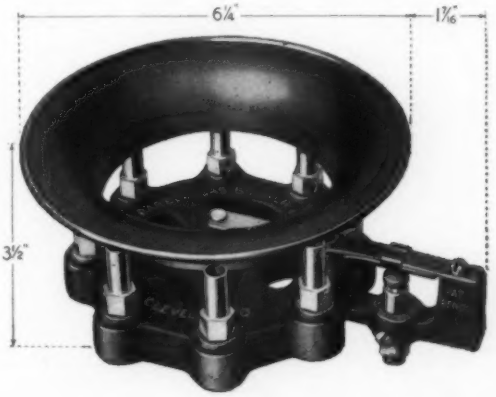
On the Fulton lever-type safety valve here shown, any pressure limit between 10 pounds and 100 pounds can be set and will not be exceeded. For relieving at lower pressures, a C-F deadweight safety valve is recommended. In any low-pressure distribution system, such a safeguard between high-pressure and low-pressure regulators is very desirable. Ask for C-F catalog covering all requirements of pressure control.

The CHAPLIN-FULTON MFG. CO.
28-40 PENN AVE. CF PITTSBURGH, PA.

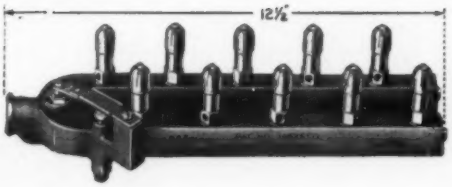
BARBER BURNERS

for All Gas-Burning Appliances

Barber is rated as the most dependable source of supply for gas burner units, because Barber has had over 20 years' experience with *other people's* burner problems. That makes dead certain that a Barber equipped appliance has the *proper* burner for its specific requirements. Barber units attain a flame temperature of 2000°F. on atmospheric pressure, with complete combustion on every type of gas, including Butane. Follow the advice of experts—if it's a gas burner job, *let Barber do it!*

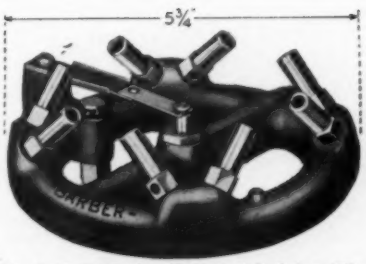


No. BP-81 Barber Burner with Safety Pilot



No. C. U.-90 Barber Burner with Safety Pilot

We are Gas Burner Specialists and offer you the facilities of our Engineering Department and Laboratory on your Gas Burner Problems.



No. S. P.-15 Barber Burner with Safety Pilot

Avail yourself of the complete and improved line of Barber Burner units, gas pressure regulators, and controls. Write for latest catalog and price list.

THE BARBER GAS BURNER CO.
3704 Superior Ave., Cleveland, Ohio

Addess Michigan inquiries to
The Barber Gas Burner Company of Michigan
4475 Cass Ave., Detroit, Michigan

"Pittsburg" Develops Plan for Selling Gas Hot Water Heaters

The advertising by a company of the equipment which it manufactures is common practice. Nor is it unusual for a manufacturer to provide the retailers handling his product with useful advertising material pertaining thereto. It is, however, a new departure in the gas industry when a water heater manufacturer develops and makes available an educational and sales promotional plan designed to sell automatic gas fired water heater service, and keeps the name of its own product in the background.

The "Pittsburg" plan has been set up for the benefit of every company or individual interested in selling automatic gas-fired hot water heaters, regardless of make. It is particularly designed to assist retail salesmen who may be representing gas companies, distributors, plumbers, or liquefied petroleum gas dealers. The purpose back of all this is to aid in creating a desire on the part of the public for automatic hot water service and to help in selling it. The Pittsburgh Water Heater Corporation is probably correct in believing that it will receive most benefit by a general increase in the demand for such service.

The educational and promotional plan as described by The Pittsburg Water Heater Corporation includes:

1. **A SALES MAKER—comprising—**
   - (a) **A portfolio of cowhide leather with two pockets for the retail salesman's use in making his presentation and sale.**
   - (b) **Thirty pages of Direct Sales Appeal size 9 x 14 inches, pictured and printed in two and three colors for visibility selling.**
   - (c) **An easel back to support all pictures.**
   - (d) **A Survey Sheet to "fit on a custom-built basis" an automatic gas water heater to the customer's needs.**
   - (e) **A thermometer to dramatize the need of automatic hot water service.**
2. **A SALES PLANNER—a book for training and guiding a retail Sales Organization. It covers mainly the subjects of:**
   - (a) **Conducting a Training School on the sale of water heaters.**
   - (b) **Suggested Duties of a Retail Salesman.**
   - (c) **Suggested Duties of a Retail Supervisor.**
   - (d) **Charts of the above three subjects.**
   - (e) **Suggested Records for Sales Follow Up.**
3. **A SALES FINDER—consisting of a newspaper and direct by mail advertising campaign which has several unusual features. For example, automatic hot water service, rather than the name of the manufacturer, is particularly stressed.**

The "Sales Maker" has several very specific points of value. First, it brings together in a compact and orderly way the various needed sales material and equipment, such as pictures, literature, survey sheets and hot water thermometer. Second, it is designed to bring action into the selling argument. A hot water requirement survey is made; hot water temperature is taken, etc. Third, definite suggestions are made to the salesman on when to ask for the order. Every sales manager knows that weakness in closing is one of the principal causes of lost sales.

The "Sales Planner" is perhaps the most unique part of the whole portfolio. It is essentially a manual for those who are charged with the management and supervision of the sales department. Unquestionably a salesman would gain invaluable information and suggestions from it; but its primary purpose is to help the department heads to train and assist those working under them and to suggest ways of operating the sales department on an efficient and effective basis. The following list of

FACT FINDING SURVEY

Proving that an Automatic Gas Water Heater will save money and increase comfort and convenience for

NAME ..... DATE .....

ADDRESS .....

	MORNING							AFTERNOON						EVENING						MAXIMUM USE	
HOUR	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	Per Hour	Per Day
Dishes																					
Washing Hands																					
Bath—Tub																					
Bath—Showers																					
Laundry—Family																					
Laundry—Odd Pieces																					
Cleaning																					
Cooking																					
Miscellaneous Uses																					
TOTAL DAILY USAGE																					

SURVEY FACTS OF NEW SYSTEM

Temperature Desired .....

Thermostat set at .....

Temperature Rise ..... Summer ..... Winter .....

Survey Facts Concerning Old Installation

Number of Hot Water Faucets ..... Bath ..... Kitchen ..... Laundry ..... Wash Basins .....

Water Temperature at Sink ..... Hot ..... Cold .....

Hot Water Piping—Kind ..... Size ..... Condition .....

Run out of Hot Water? ..... When? .....

Present Water Heater ..... Type ..... Size .....

Cost of Service .....

Recommended Heater ..... Type ..... Size .....

Delivered Price $ ..... Installation Cost $ ..... Total Cost $ .....

Actual Size of Survey Form, 8½ x 11

headings gives some idea of the scope of the book:

A Word to the Instructor, Pointers on Successful School Operation, Getting the School Under Way, Hot Water—Its Uses, Advantages of Automatic Hot Water Service, Different Types of Automatic Gas Heaters, Prospects, Contact Work, Selling Points, Suggested Sales Approach, Objections and Answers, The "Sales-Maker," Making the Survey to Determine the Proper Size Heater, Getting Ready for Work, Analysis Chart of Sales Work, Suggested Duties of a Salesman, Analysis Chart of the Sales Supervisor, Analysis Chart of the Sales Manager, Suggested Duties of the Sales Manager, Sales Records for Following a Sale, Daily Report of the Supervisor, Notes.

Any inquiries as to the cost and availability of this material should be addressed to The Pittsburg Water Heater Corporation, Pittsburgh, Pa.

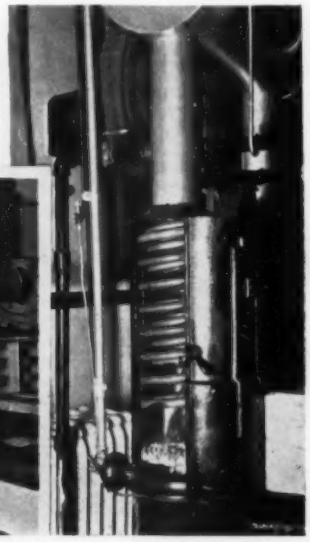
A New Device Controlling the Incubation Period for Fish Eggs Developed by U. S. Bureau of Fisheries

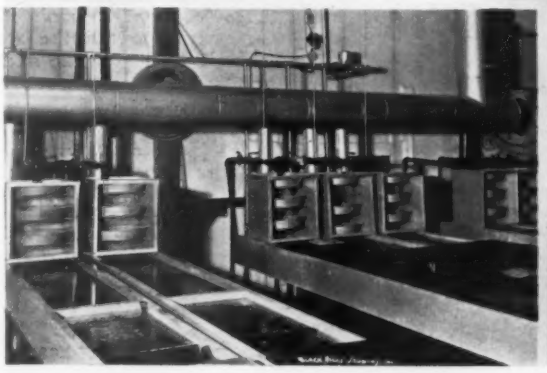
Studies made by the U. S. Bureau of Fisheries under the direction of Fred J. Foster, Regional Director of Seattle, Washington, and carried on by the Bureau's Spearfish, South Dakota station, in heating water for fish-cultural purposes, have resulted in greatly lessening the necessary time for fish eggs to hatch. The device consists of a series of gas fired copper coil heaters similar to those commonly used in heating water for domestic use. The water passes through about 10 feet of copper coils over a gas fire and enters the hatching trough at any predetermined temperature. The whole unit is controlled thermostatically.

Hatchery officials state that it will now be possible to produce larger and healthier fingerlings at many of the hatcheries throughout the country, having water that is too cold during the incubation period which is usually during the winter months.

It has also been discovered that the water passing through the copper coils is beneficial in retarding the fungus growths on the eggs, a condition that heretofore gave much annoyance to hatchery workers.

The Spearfish Station, located in the beautiful Black Hills of South Dakota, is the first to use this equipment.





Three Generations of Mains

A recent street excavation in Dixon, Ill., to repair a gas main in the distribution system of Illinois Northern Utilities Co. exposed an interesting disclosure. In the adjoining cut three pipe lines are shown. On the right a wood pipe line, laid before the Civil War and probably belonging to the original water supply system. On the left a 3-inch wrought iron gas main laid about 1877 when the first gas franchise was granted in Dixon. This line distributed oil gas from a plant located on Highland Avenue. In the center, the present 8-inch cast iron gas main installed in 1901 and distributing mixed gas (water and coal) which comes from the Central gas plant at Sterling, Ill.

Intellegamus parvum de omnibus unum excellenter

This is Latin for: ***"Let us know something of many things, but one thing excellently."***

•

FOR TWENTY YEARS we have concentrated on doing a single job excellently—producing the iron oxide that will give the gas company the *lowest final cost* of purification. That is why dozens of plants (largest, smallest, medium) are now using *exclusively* GPM Iron Hydroxide, product of the Gas Purifying Materials Company Inc., Long Island City and Providence.

GPM IRON HYDROXIDE

Pfeiffers Marine Grill in Buffalo, where the electric equipment on the left was replaced by modern gas fired range, roasting oven, fryers and heavy duty broiler (see right).

Gas Replaces Electricity for Cooking in Two Important Buffalo, N. Y. Restaurants

Two outstanding installations of heavy duty gas cooking equipment were recently completed in two important Buffalo restaurants to replace comparatively new electric installations, as announced by W. H. Frick, Manager of the Heavy Duty Equipment Department of American Stove Company.

In May, 1937, Lorenzo Paca and Sam Poalini, who operate "Lorenzo's," popular Italian-American restaurant, installed an entire battery of electric cooking equipment, which received considerable publicity in national food equipment journals. Yet in only a year and a half, a replacement was effected. This is not only eloquent testimony to the economy and other advantages of gas, but an example of the value of persistent selling.

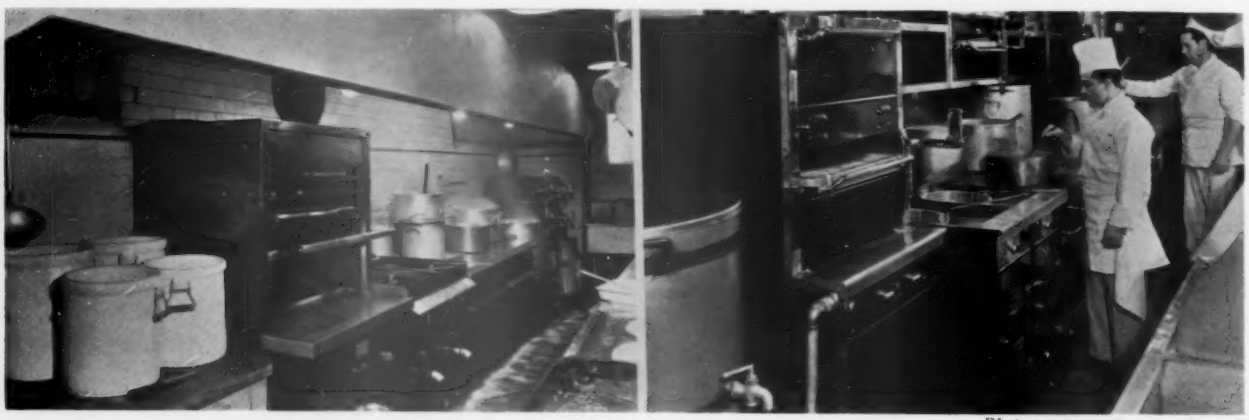
In spite of the fact that this installation had been in only about one year, early in 1938, the American Stove Company's salesman, in cooperation with representatives of the Iroquois Gas Corporation, started to tell the story of "Cooking with Gas." By the middle of the year this missionary work was beginning to take root.

In October, a survey and data on comparable cooking costs were requested, with results so amazing it seemed like a "believe it or not." Nevertheless, after checking and rechecking, the same answer was arrived at. From then on it was easy. On November 21st, the entire electric equipment was replaced. Lorenzo's are now using a battery of three large Magic Chef heavy duty uniform heat top ranges, broiler, fryer and other equipment, complete with high double-deck back shelves. The Iroquois Gas Corporation also replaced oil fired water heaters with two No. 8 Ruud Water Heaters.

The only other outstanding battery of electric equipment in Buffalo was at Pfeiffer's Marine Grill, and this, too, offered an irresistible sales target. The selling efforts on both Pfeiffer's and Lorenzo's were carried on simultaneously, and both installations completed by December 1, 1938. The Pfeiffer installation consists of two large Magic Chef heavy duty uniform heat top ranges, one open top Magic Chef, a double deck roasting oven, two fryers and a large heavy duty broiler.

The Lorenzo installation resulted in a net saving of well over $100 on the first month's operation, as shown by the first full month's fuel bill received since installation. Costs for a full month at Pfeiffer's are not yet available.

Both these installations formerly used Niagara Falls power at a rate of 7 mills per k.w.h. They are now using mixed gas with a B.T.U. value of 900 at 65 cents per M. The facts obtained on these two jobs have proved, definitely, not only the economy, but the speed and flexibility of gas. In these two busy restaurants, where speed is a factor and uniform results necessary in maintaining their reputations for fine food, gas has proved indispensable as a cooking fuel.



Photos courtesy American Stove Co.

On the left is the old electric equipment in Lorenzo's restaurant in Buffalo replaced (on the right) with three heavy duty ranges, broiler, frier and other gas fired equipment.

13th Annual Business Conference
The New England Gas Association

February 16 and 17, 1939—Hotel Statler, Boston

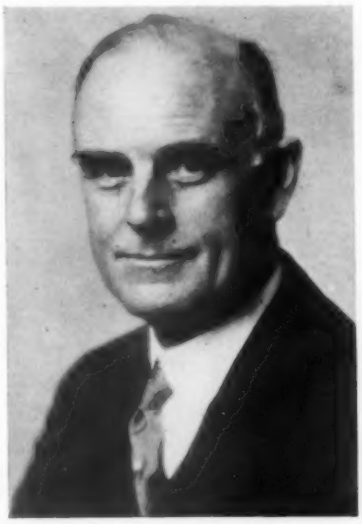
The Program

Thursday—10 a.m.

1. Sales Contest Awards
2. Election of Officers and Directors
3. Prize Awards—Appliance Selling Essays
   Ralph G. Wells
   Head of Bureau of Business Research
   Boston University College of Business Administration
4. A Look Ahead
   Alexander Forward
   Managing Director, American Gas Association
5. Best Paper Awards
6. Report of Executive Secretary—N.E.G.A.
   Clark Belden
7. Address of Vice President of A.G.A.E.M.
   Frank H. Adams
8. President's Address
   George S. Hawley
   President, N.E.G.A.
   President, The Bridgeport Gas Light Company
9. The Industry Briefly Reviewed
   Conrad N. Lauer
   President, American Gas Association
   President, The Philadelphia Gas Works Company

Thursday—2 p. m.

1. Progress in Gas House Heating
   Herbert G. Schaul
   Chairman, House Heating & Air Conditioning Committee, A.G.A.
   Manager, House Heating Division, Westchester Lighting Company
2. Industrial and Commercial Gas Sales—An Asset and A Challenge to the Gas Industry
   Frank H. Trembly, Jr.
   Assistant Sales Manager, The Philadelphia Gas Works Company
3. Economies in Utility Storekeeping Through Inventory Control
   R. J. Daniels
   New England Power Service Co.
4. Let Us Look at the Record
   A. M. Beebee
   General Supt., Gas Department, Rochester Gas & Electric Corp.
5. Trends in Service Practice
   Andrew W. Johnston
   Superintendent of Customer Service, The Hartford Gas Company
6. The Relation of Promotional Expenses to Results
   Harold L. Dalbeck
   General Auditor, New England Gas & Electric Association



GEORGE S. HAWLEY

Friday—10 p. m.

1. Gadgets, Women and Ranges
   Frank M. Houston
   Chairman, Domestic Range Committee, A.G.A.
   Manager, Domestic Sales Dept., Rochester Gas & Elec. Corp.
2. A New Approach to Gas Water Heating Sales
   Roy E. Wright
   Asst. to Vice Pres., New England Gas & Electric Association
3. Employee Training and Development Should Be a Continuous Activity
   Ralph G. Wells
   Head of Bureau of Business Research
   Boston University College of Business Administration
4. Kitchen Heating—Our Younger Child
   John J. Quinn
   Sales Manager, Boston Consolidated Gas Company
5. Are Manufactured Gas Companies' Selling Plans Adequate for Domestic Load Building?
   Elmer E. Linburg
   Manager, Gas Division, Metropolitan Edison Company, Easton, Pa.
6. Some Important Gas Industry Sales Fundamentals
   R. L. Towne
   Sales Promotion Manager, The Surface Combustion Corp.

Friday—2 p. m.

1. Refrigeration Possibilities
   R. J. Rutherford
   Vice President, Worcester Gas Light Company, Worcester
2. Progress in Reducing Gas Production Costs
   Leon J. Willien
   Chief Gas Engineer, Public Utility Engineering and Service Corp., Chicago
3. Public Opinion—What About It?
   Claude Robinson
   President, Opinion, Inc.
   Former Associate - Director, American Institute of Public Opinion
4. Industrial Development and Progress
   Howard W. Dunbar
   Vice President, Norton Company, Worcester
5. Speaker to be announced.

As usual, there will be a Directors' Dinner on Wednesday evening. This year there will be three speakers on the program.

The Dinner and Dance will be held on Thursday evening, with a strong entertainment program.

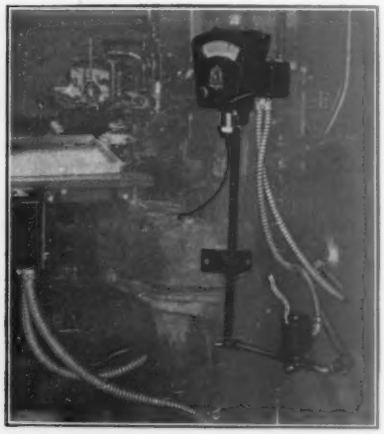
The Home Service Luncheon will be held on Friday noon, followed by a special program of interest to this group.

New Equipment

Partlow Control for Gas Heated Pots

Overheating or underheating of type metal causes imperfect slugs and damage to moulds. Constant uniform temperature is essential to economic operation.

Combining in one instrument accurate indication and regulation of the temperature of metal pots, this



Partlow MCR Control

Partlow control maintains the temperature which is set on the scale by a red colored pointer. The setting may be changed by turning a knob on the front of the case. This model designated as MCR is a two wire control having a capacity of 500 watts A. C., 50 watts D. C., for solenoid gas valves on gas heated pots.

Made by The Partlow Corporation, New Hartford (suburb of Utica) N. Y.

Combustible Gas Indicator

An improved Combustible Gas Indicator (an instrument that measures directly the inflammability and explodibility of gas-air mixtures) is announced by the Davis Emergency Equipment Co., New York.

The new Davis Indicator retains the features of small size, light weight, large meter, and rugged parts, which characterized the older model, but has improvements which add to the convenience and reliability of the instrument, according to the manufacturer.

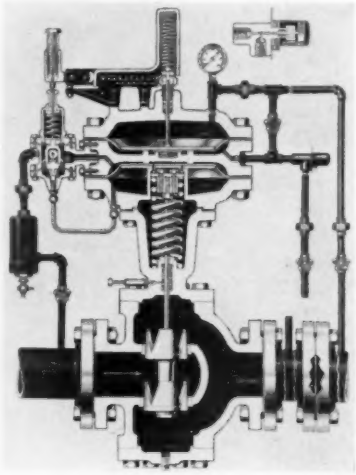
These improvements include battery clips of special design, which allow for the expansion of the batteries as they run down and maintain perfect electrical contact at all times, and also resistors of a new type, which are wound on bakelite spools and are so mounted that they cannot be damaged. All of the working parts of the new model are attached to the top panel, so that they can be removed as a unit for inspection and repair.

"Unaccounted For" Gas Reduced With Fisher-King Booster

After more than five years of development and actual testing in the field on 157 installations, the Fisher Governor Company, Marshalltown, Iowa, has announced its Fisher-King Gas Pressure Booster.

According to a recent statement issued by N. T. Chadderdon, president of the Company, this new device enables gas system pressures to be lowered 25 to 50 percent., with corresponding reductions in leakage on "unaccounted for" gas.

Briefly, the Fisher-King Booster maintains a constant pressure at the low pressure point in the distribution system, regardless of the demand load. This is accomplished by boosting the down stream or reduced pressure in the system to correspond with, and counteract ex-



actly, the pressure drop caused by friction in the downstream or reduced pressure piping system.

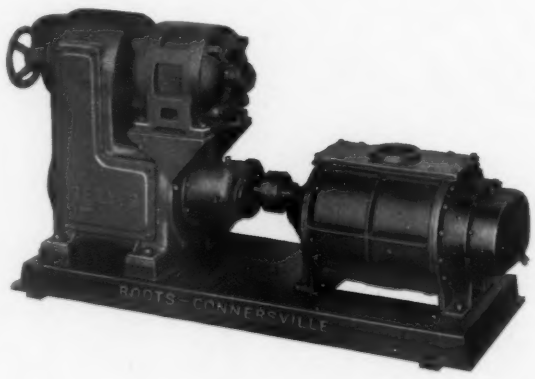
The Booster can be used for reduced pressures in either inches of water column or ounces but finds its widest application for pounds per square inch pressures with values up to 300 lbs. per sq. in., or higher.

An interesting 24 page book on this new device is available.

Controlled Variation in Air Volumes

Utilizing the positive displacement characteristic of their blowers, the Roots-Connersville Blower Corp. of Connersville, Indiana, is supplying units that include variable speed drives of different types and ratios, which give a positive control of desired changes in air delivery. In a majority of installations, manual control by the operator is used, but it is also possible to supply automatically operated control to change the speeds and air volumes. With these variations, there results a further economy in power, from that required at the normal maximum load.

In the illustration is a Roots-Connersville Positive Type Blower with variable speed drive to deliver volumes ranging from 70 to 420 cu. ft. of air per minute against a constant pressure. Other sizes which are available for smaller or larger capacities and for other ratios of change, are listed in their bulletin 21-B-19, that may be obtained by writing this publication or direct to the company.



Variable Volume Blower

and Appliances

1939 Model Electrolux

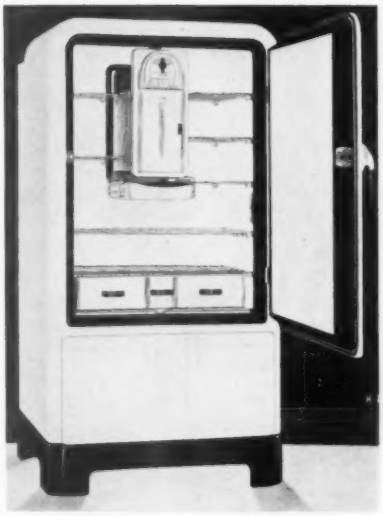
The 1939 Servel Electrolux gas refrigerator is styled on even more charming lines than in other years, and an improved method of air-cooling provides better refrigeration than ever before. The new beauty of the cabinet is due to a panelling effect on the doors.

The one-piece steel shell construction is continued in the 1939 models. This construction does away with all seams and gaskets on the outer surface of the cabinet, giving it an even smoothness. The refrigerator is easier to clean for there is no place on the top, side or corners that cannot be wiped or washed simply.

Through a change in the construction of the refrigerating unit the flow of air is increased which creates a greater cooling effect.

The 1939 ice cube grid is made of aluminum making it lighter and easier to handle. The new aluminum grid, like the 1938 grid requires only a slight pressure of the fingers to release the cubes. This does away with the old-time water faucet method of releasing ice cubes.

Other up-to-date conveniences comprise the illuminated temperature dial; the easily controlled defrosting device; the two way storage tray; a superior type of interior lighting; the "easy-to-read" cold indicator, and vegetable fresheners that are interchangeable with the defrosting tray.



1939 Model Servel Electrolux

This new unit operates, of course, on the principle that made its name famous as the refrigerator without moving parts. It assures permanent silence, continued low operating costs, more years of service, and savings that pay for it. Manufactured by Servel, Inc., Evansville, Ind.

G-E Gas-Fired Air Conditioner

The new series of gas-fired warm air conditioners recently developed by the General Electric air conditioning department, Bloomfield, N. J., are available in both horizontal and vertical combinations with capacities of from 60,000 to 216,000 Btu per hour. The vertical type represents a marked departure in design for this type of unit, and considerably increases the number of possible applications. Since the floor space required for its installation is less than in the case of the horizontal unit, it suggests itself for new homes without basement. Or it will provide winter air conditioning for apartments, providing an individual control to each apartment in a building, or for small stores and offices. This unit can be used with or without a duct system.

The horizontal unit is a further development of the gas-fired warm air conditioner and has been styled to harmonize with any game room or basement.

Both of the new types of gas-fired conditioners automatically heat, clean, circulate, and humidify the air, in a single compact unit. Summer cooling can be added later if desired.

The vertical-type units are available with capacities of 60,000, 78,400, 96,000, and 112,800 Btu. Both types are enclosed in two-tone gray steel cabinets.

The Zephyr Oven

Designed particularly for "Pan and Hearth Goods" where high production rate, low production cost and flexibility of capacity and heat control are paramount requirements, the "Zephyr" oven, built on the unit system, are especially adapted for use in retail bake shops, hotels, restaurants and as an auxiliary for the wholesale baker.

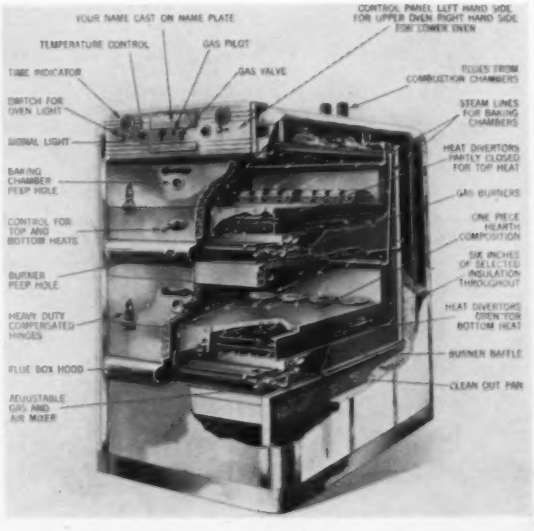
They use indirect, recirculated, convected heat so that the products of combustion cannot come in contact with the goods on the hearth.

Heat flow is illustrated in the adjoining cut which sets forth the many other features including controls, thick rock wool insulation, time indicator, etc.

Each unit has two baking chambers separately fired and with independent control. Normal fuel consumption is 20-50 cu. ft. of 530 B.T.U. gas per hour for each chamber which measures 37" wide, 54" deep and 12" in the clear.

Additional units up to 6 may be added to assembly as required.

Further interesting information with capacities and gas consumption available through the builders, Steiner-Ives Co., Locust & Nelson Sts., Bloomfield, N. J.


YOUR NAME CAST ON NAME PLATE
CONTROL PANEL LEFT HAND SIDE FOR UPPER OVEN RIGHT HAND SIDE FOR LOWER OVEN
TEMPERATURE CONTROL
GAS PILOT
TIME INDICATOR
GAS VALVE
FLUES FROM COMBUSTION CHAMBERS
SWITCH FOR OVEN LIGHT
STEAM LINES FOR BAKING CHAMBERS
SIGNAL LIGHT
HEAT DIVERTORS PARTLY CLOSED FOR TOP HEAT
BAKING CHAMBER PEEP HOLE
GAS BURNERS
CONTROL FOR TOP AND BOTTOM HEATS
ONE PIECE HEARTH COMPOSITION
SIX INCHES OF SELECTED INSULATION THROUGHOUT
BURNER PEEP HOLE
HEAT DIVERTORS OPEN FOR BOTTOM HEAT
HEAVY DUTY COMPENSATED HINGES
BURNER BAFFLE
FLUE BOX HOOD
CLEAN OUT PAN
ADJUSTABLE GAS AND AIR MIXER

Zephyr Bake Oven, Single Unit, Two Chambers

A Complete and Authoritative Treatise on this Vital Subject—

PIPE CORROSION and COATINGS

by
Erick Larson

Past Chairman of American Gas Association Distribution Committee; Author of articles on High Pressure Distribution and Regulator Structures.

Written in plain understandable language for practical men

Fully illustrated with many diagrams, charts, and photos. A general outline of the subjects covered is given in the chapter titles.

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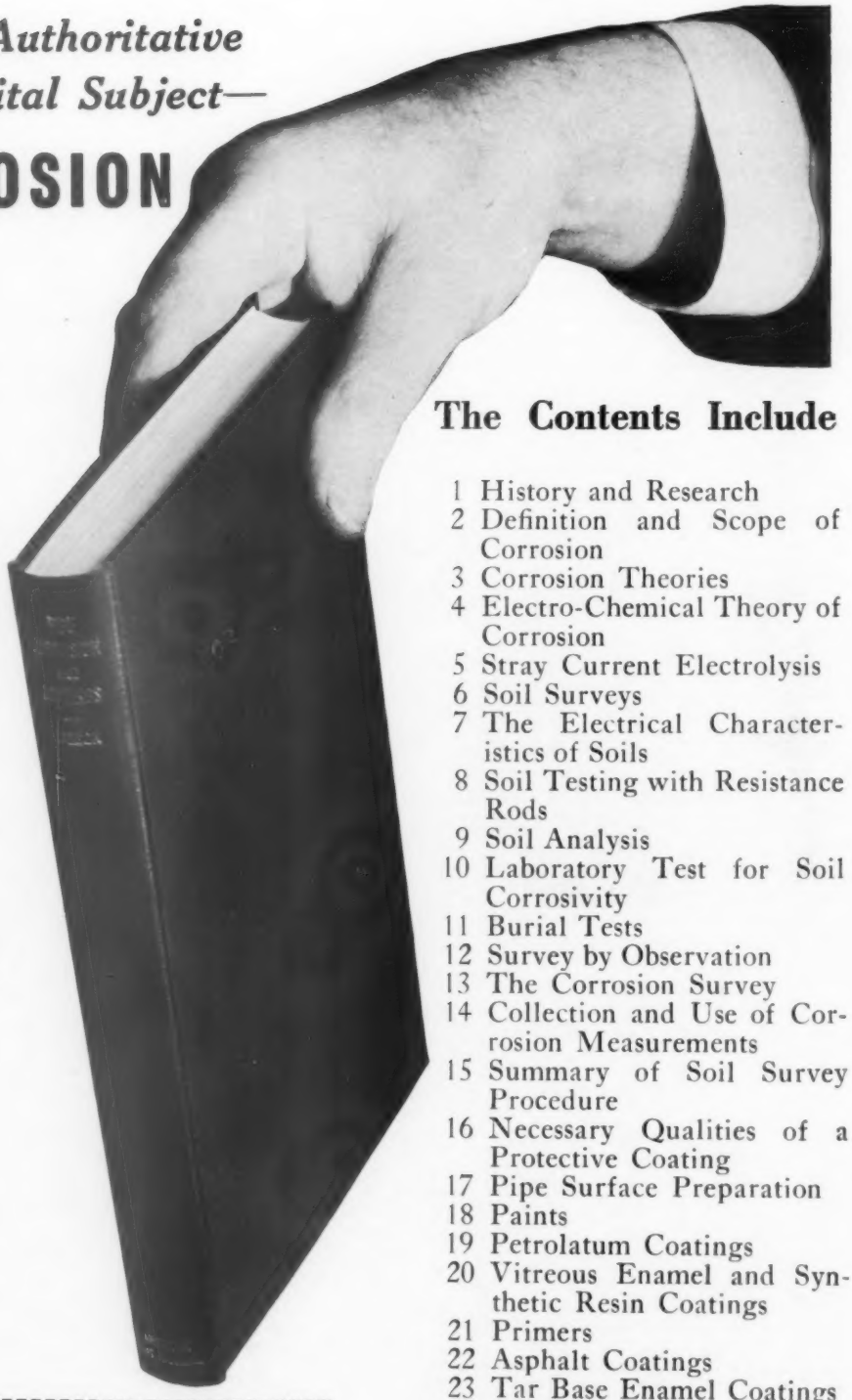

The Contents Include

1 History and Research
2 Definition and Scope of Corrosion
3 Corrosion Theories
4 Electro-Chemical Theory of Corrosion
5 Stray Current Electrolysis
6 Soil Surveys
7 The Electrical Characteristics of Soils
8 Soil Testing with Resistance Rods
9 Soil Analysis
10 Laboratory Test for Soil Corrosivity
11 Burial Tests
12 Survey by Observation
13 The Corrosion Survey
14 Collection and Use of Corrosion Measurements
15 Summary of Soil Survey Procedure
16 Necessary Qualities of a Protective Coating
17 Pipe Surface Preparation
18 Paints
19 Petrolatum Coatings
20 Vitreous Enamel and Synthetic Resin Coatings
21 Primers
22 Asphalt Coatings
23 Tar Base Enamel Coatings
24 Practical Considerations in Application of Primers, Coatings &c.
25 Pipe Coating Fillers
26 Pipe Coating Shields
27 Cement Coatings
28 Cathodic Protection.

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Book Reviews

Winter Air Conditioning: Forced Warm Air Heating, by S. Konzo, Special Research Assistant Professor, University of Illinois. Published by the National Warm Air Heating & Air Conditioning Association and for sale by American Gas Journal, Inc. Cloth bound, 532 pages, 6 x 9 in. Price $3.00.

In this book there is made available to the gas industry an outstanding addition to the literature available on forced warm air heating and winter air conditioning. The author has been identified with the warm air heating research work carried on at the University of Illinois under a cooperative agreement with the National Warm Air Heating and Air Conditioning Association. He has lived in the Research Residence, in which the research work has been conducted, and has therefore had a most exceptional opportunity to observe the performance of a forced warm air heating installation in actual operation, with different arrangements of the air supply and distributing system.

In this book Professor Konzo has compiled and arranged in logical sequence a large amount of data and useful information on the subject based not only on the results of his tests, but also on the studies of others. It accordingly comprises a manual on the design, construction, installation and operation of a modern residential winter air conditioning system.

The text is broad in its scope. The earlier chapters deal with the fundamentals, including such subjects as wet and dry bulb temperatures and relative humidity, humidification requirements and limitations, and the other factors that make for comfort. Succeeding chapters then take up the engineering phases of the subject, including heat loss calculations, and the several factors affecting heat loss. Next the author covers the practical factors such as dampers in duct systems, location of registers and other points on which the practical man must be well versed if he would make satisfactory installations. Such subjects as registers and their positions, humidity, pressure and temperature losses and similar subjects have been covered in a clear and authoritative manner.

For any one who is interested in warm air heating or winter air conditioning we have no hesitation in recommending this book.

Summer Cooling in the Warm-Air Heating Research Residence with Cold Water, by A. P. Kratz, S. Konzo, M. K. Fahnestock and E. L. Broderick. Published by the University of Illinois, 92 pages, 6 x 9. Price 90 cents.

This bulletin of the Engineering Experiment Station of the University of Illinois is a report of the results of an investigation conducted under the terms of cooperative agreements between The National Warm Air Heating and Air Conditioning Association, the American Society of Heating and Ventilating Engineers and the University of Illinois.

Studies of summer cooling in the Research Residence conducted during the seasons of 1932, 1933 and 1934 have been published in Bulletin #290 of the Engineering Experimentation Station. The resul s obta'ned during the seasons of 1935 and 1936 are included in this second Bulletin, #305.

The contents includes description of the plant and apparatus at the Research Residence; test procedures; results of the tests, including calculations; results of studies on registers, and method used for calculation of cooling load.

Food For Thought

1. 20,000 miles of mains surveyed.

2. 14,000 new gas leaks located.

3. 40,000 valuable reports made on trees and shrubs.

4. 150 companies using the service.

5. Enough savings in unaccounted for gas to pay the bill.

6. A trial will convince you.

May we hear from you?

New England Forestry Service Inc.

75 Federal St., Boston, Mass.

Obituary

Edwin W. Ehmann, an official of the Philadelphia Electric Company, and a past president of the Pennsylvania Gas Association, died suddenly in Philadelphia on January 6.

Mr. Ehmann was manager of the Main Line Division of the Philadelphia Electric Company, with Offices in Ardmore. He was born in Schuylkill Haven, Pa., on March 22, 1887. Following his graduation from Lehigh University as an electrical engineer in 1910, he entered the employ of The Philadelphia Gas Works Company as a cadet engineer.

Edwin W. Ehmann

Prior to his connection with the Philadelphia Electric Company, as superintendent of the electrical department of the Schuylkill and Main Line Divisions, he was an engineer with the Fulton County Gas and Electric Company, Gloversville, N. Y. His wife and two sons survive.

S. W. MEALS

Samuel W. Meals, President Carnegie Natural Gas Co., Pittsburgh, Pa., died January 4th at the age of 69. Mr. Meals had been associated with the oil and gas industry for over 50 years. In 1917 he became general superintendent of the Carnegie Natural Gas Company. In 1919 he was elected vice-president and general manager, and on November 1, 1921, was elected president of the company.

Proposes Pipe Line

The North Dakota Consumers Gas Company has filed with the Federal Power Commission an application for a certificate of public convenience and necessity for, or an order disclaiming jurisdiction over, the construction, operation and maintenance of natural gas pipe lines from Mandan to Fargo and from Fargo to Grand Forks, North Dakota, and from a point near Grand Forks to Crookston, Minnesota, for the transportation, distribution and sale of natural gas to municipalities, corporations and individuals.

News of the Industry

National Sales Campaign for Gas Appliances Launched

To effectively dramatize the benefits of automatic gas water heating, the Association of Gas Appliance and Equipment Manufacturers is launching a nationwide sales promotion campaign to extend throughout the year.

Enlisting the support of gas company executives and employees, dealers, architects and builders, the promotional project will be aimed at creating greater public demand for gas water heating through more adequate sales presentations and more informed public contacts.

Gas companies will be urged to undertake greater local advertising and other promotion. Suggested newspaper advertisements, bill enclosures, mailing pieces, window displays, show-room banners, carcards and large posters will be included in the sales promotional material made available to the local companies.

The elements of health, beauty and convenience will be featured in the campaign which will stress gas water heating as the "24 hour servant" that furnishes hot water to the average home 150 times a day.

Twenty-eight thousand retail plumber-dealers will receive promotional plans built around the profits to be derived from water heater sales and installations. They too will be urged to conduct local advertising endeavors and will be supplied with material to assist them in such undertakings.

Architects and builders will receive an up-to-date "Architects Manual on Gas Water Heating," prepared by a well-known architect.

As a key part of their 1939 program the Association of Gas Appliance and Equipment Manufacturers will conduct two prize essay contests; one for gas company executives and employees and the other for retail dealers. Prizes for the two competitions will be duplicated. The first prize will be $500; the second $250; the third $150, and the fourth prize $100.

The essay contests will close April 1st and the awards will be announced May 1st.

The subject for the gas company contest will be "The Value of the Water Heating Load and How It May be Secured." The dealers will write on "What the Promotion of Automatic Gas Water Heaters has Done for My Business."

There will be no limitations as to the number of words a contestant may use thus enabling him to treat the subject as thoroughly as he sees fit. Awards will be based entirely on the excellence of the paper. Sales records will have no influence whatsoever.

A. G. A. Essay Contests

Two essay contests sponsored by the American Gas Association and directed to the attention of the natural gas industry have been announced by Thomas R. Weymouth, chairman of the Natural Gas Section of the Association. A total of $150 in prizes is being offered for the best essays submitted in each contest before March 15, 1939.

The subject selected for the first contest is "The Duties of a Local Manager." This subject will cover all phases of the resident management of a natural gas utility serving a specific city or town. The second contest is similar in scope but covers specifically "The Duties of a District Manager." This subject includes all phases of the resident management of a natural gas utility serving several towns or cities.

Prizes in each contest will be: First—$25.00; Second—$15.00; Third—$10.00; five honorable mention prizes—$5.00 each. Each contest will be run separately.

The following rules govern both contests:

1. Contest is open to all employees of member companies of the American Gas Association.
2. Papers must be limited to maximum of ten pages, double space.
3. Papers must be typewritten on sheets 8½ x 11 inches.
4. Original and three copies of each paper must be submitted.
5. Papers must be forwarded on or before March 15, 1939, to E. H. Poe, Secretary, Natural Gas Section, American Gas Association, 420 Lexington Avenue, New York, N. Y.
6. The decisions of the judges are to be final.
7. All papers submitted in the contest are to become the property of the Natural Gas Section of the American Gas Association.

As a special feature of the contests it is contemplated that the authors of the prize winning papers will present them at the annual meeting of the Natural Gas Section at Tulsa, Okla., in May, 1939. Present plans call for a session of the meeting to be devoted to the problems of local and district managers of natural gas companies.

Poor's Publishing Company Issues Survey of Electric Power and Gas Utilities

The position and outlook of the utility industry is generally favorable because of the potential demand for its products; but Government regulation, competition, taxation and possible inflation are present or possible future problems of major proportions. Broadly speaking, these are the conclusions reached in Poor's Survey, issued November 12, 1938.

"The natural gas industry must contend with rate reductions resulting from political and competitive pressure as well as increased regulation at the hands of the Federal Power Commission. Moreover, demand will continue unusually subject to weather conditions. However, the commodity's natural advantages assure for it continued growth, while increased application to industry promises participation in the current business recovery. Thus, with costs on a relatively stable basis, profits should improve.

"The manufactured gas industry faces a more restricted market which limits expansion possibilities while competition from other fuels promises to increase rather than to diminish. Rate reductions of recent years suggest that former high earning power can never be regained, even though moderate increases may be granted. Meanwhile, rising fuel, labor, and tax costs threaten even current profit levels. However, the development of new uses, aggressive promotional work and the introduction of natural gas in particular may help to check the declining trend."

The Survey discusses the growth of the industry, the scope of Federal legislation, arbitrary powers under the Public Utility Act and the Federal Power Act, attitude of SEC and supervision by it, attitude and authority of Federal Power Commission, government competition, taxation, rates, uniform system of accounts, earnings trends, the manufactured gas industry, and the natural gas industry, including its regulation under the Natural Gas Act. Certain pertinent statistics of the utility industry are presented, and the earnings and outlooks of a number of the more important utility companies are analyzed in detail.

The Survey is obtainable from Poor's Publishing Company, 90 Broad Street, Wellesley, Mass. Where not furnished as part of regular investment service, the price is $5.00 per copy.

Uniform System of Accounts

Copies of the annual report form for gas and electric utilities coordinated with the revised Uniform System of Accounts for those utilities are available from Clyde S. Bailey, Secretary, National Association of Railroad and Utilities Commissioners, 7411-15, Post Office Building, Washington, D. C., at $3.00.

Empire State Gas Sales Managers To Meet

A program of interest to Gas Sales Managers has been arranged for a meeting on February 24th at the Belmont-Plaza Hotel, New York City, sponsored by the Empire State Gas and Electric Association.

Chairman Walter G. McKie of Rochester has arranged a program of timely subjects for discussion. Mr. Irving K. Peck, Vice President of the Association will speak on some of the problems before us in the gas industry. Four symposiums have been arranged under the heading of—Certified Performance Range, House Heating, Water Heating and Refrigeration.

Among those who will act as Discussion Leaders are—W. J. Schmidt, Long Island Lighting Co., Herbert G. Schaul of Westchester Lighting Company, R. E. Williams of Binghamton Gas Works and R. A. Lauder, Consolidated Edison Co. of N. Y. Inc.

Sessions will open at 9·30 A. M. and last throughout the day.

Southern Gas Association Convention Cruise

In deciding to hold their 1939 Convention in the form of a cruise, the officers of the Southern Gas Association feel that many unusual advantages will be offered to members. The transatlantic liner "ROTTERDAM" has been secured for the Convention Cruise, and will sail from New Orleans on Sunday, March 19th, to Havana, spending two days and one night in that city, and returning to New Orleans on March 24th. General session meetings and sales, technical, industrial and home service conferences will be held on board ship on March 20th, and 23rd and the general sessions and election of officers on the morning of the 24th.

Joint Meeting of A.S.M.E. and Louisiana Engineering Society

The American Society of Mechanical Engineers together with the Louisiana Engineering Society will hold a joint meeting in New Orleans on February 23, 24, and 25. Headquarters and registration will be at the St. Charles Hotel in New Orleans. This meeting is being held immediately following Mardi Gras and will give an opportunity to a number of engineers and their families to enjoy this celebration and attend the technical exercises.

E. W. Seeger and P. B. Harwood Promoted

The promotions of Mr. E. W. Seeger to Chief Engineer and Mr. P. B. Harwood to Assistant Chief Engineer are announced by Mr. W. C. Stevens, Vice President in Charge of Engineering, Cutler-Hammer, Inc., Milwaukee, Wis. Prior to their advancements, Mr. Seeger was Assistant Chief Engineer and Mr. Harwood General Engineering Supervisor.

CONVENTION CALENDAR

February

9-11 *Midwest Regional Gas Sales Conference,* Stevens Hotel, Chicago.

16-17 *New England Gas Association.* Annual Business Conference, Hotel Statler, Boston.

March

2-3 *Eastern Natural Gas Regional Gas Sales Conference,* Roosevelt Hotel, Pittsburgh, Pa.

8-10 *International Acetylene Assn.* Rice Hotel, Houston, *Texas.*

13-14 *Wisconsin Utilities Assn.-Gas Division,* Pfister Hotel, Milwaukee, Wis.

19-24 *Southern Gas Association.* On board S. S. Rotterdam sailing New Orleans to Havana, Cuba, and return.

20-21 *Oklahoma Utilities Assn.,* Tulsa, Okla.

April

10-12 *Mid-West Gas Association,* Des Moines, Ia.

12-14 *Missouri Association of Public Utilities.* Annual Convention.

17-19 *American Gas Association,* Distribution Conference—Technical Section, Palmer House, Chicago.

May

2-4 *Pennsylvania Gas Association,* Annual Meeting, Sky Top Club, Sky Top, Pa. Secretary, Frank W. Lesley, Penna. Gas & Electric Co., York, Pa.

8-11 *American Gas Association.* Natural Gas Section, Tulsa, Okla.

15-17 *American Gas Assn.* Joint Production and Chemical Committee Conferences, — Technical Section, Rochester, N. Y.

24-26 *Assn. Gas Appl. & Equipt. Mfrs.* Roosevelt Hotel, New York, N. Y.

June

6-7 *Canadian Gas Association,* Annual Convention, Royal Connaught Hotel, Hamilton, Ont. Secy-Treas. G. W. Allen, 7 Astley Ave., Toronto 5, Ont.

9 *Empire State Gas & Electric Assn.* Group Meeting (Gas Operating) Tower Club, Park Central Hotel, New York.

September

4-9 *Pacific Coast Gas Assn.* Fairmont Hotel, San Francisco.

9 *Gas Industry Day,*—Golden Gate Exposition.

October

9 *Gas Industry Day,* — New York World's Fair.

9-12 *American Gas Assn.* Annual Convention, New York, N. Y.

Bush Re-elected President Electrical and Gas Association of New York

A Lincoln Bush, President of Belmont Electric Company, Inc., was re-elected President of the Electrical and Gas Association of New York, Inc., at its Annual Meeting held at its Institute Headquarters in Grand Central Palace, January 18th.

Other officers elected by the Association were: E. F. Jeffe, Vice President, Consolidated Edison Company of New York, Inc., First Vice-President; J. H. McKenna, Eastern Sales Manager, A. J. Lindemann & Hoverson Company, Second Vice-President; Hugh Cuthrell, Vice President, The Brooklyn Union Gas Company, Third Vice-President; David S. Youngholm, Vice President, Westinghouse Electric and Manufacturing Company, Fourth Vice-President; P. Schuyler Van Bloem, President, Viking Lights, Inc., Treasurer; S. J. O'Brien, President, S. J. O'Brien Sales Corporation, Secretary; H. C. Calahan, District Manager, General Electric Supply Corporation, Assistant Secretary.

Maryland Utilities Association

At the last Board meeting of the Maryland Utilities Association on January 20th preliminary plans were made tor the spring meeting. This is scheduled to be held at the Lord Baltimore Hotel in Baltimore, Maryland, on April 14, 1939.

The morning session will consist of three group meetings, gas, electric, and transportation. A luncheon is planned to follow these meetings. The afternoon session will be a combined meeting of the three utilities.

Wisconsin Utilities Association

The annual convention of the Gas Section of the Wisconsin Utilities Association is to be held in March. The program will be completed shortly.

Annual Convention Advertising Federation of America

The Federation's annual convention, which will be held in New York at the Waldorf-Astoria, June 18-22, is organized advertising's big event of the year, in which many advertising organizations participate, holding individual sessions, with general meetings for the entire attendance.

Mason Britton, vice-chairman of the board, McGraw-Hill Publishing Company, New York, is chairman of the Federation's board of directors, with George M. Slocum, publisher, Automotive News, Detroit, serving as president.

Henry Obermeyer, assistant vice-president, Consolidated Edison Company of New York, and a Federation director, heads the convention's Program Committee, with William A. Hart, director of advertising, E. I. Du Pont de Nemours & Company, Inc., Wilmington, Del., as vice-chairman.

The 1939 Gas Refrigerator Campaign

The 1939 Spring and Summer gas refrigerator selling campaign will be conducted this year on a scale even larger than that of other years, according to announcement from the American Gas Association Refrigeration Committee. Hundreds of gas utilities and thousands of sales employees of such companies will compete for $30,000 in cash awards along with the usual trophies that go to winning companies.

This year's trophy will be a model of the famous American clipper ship, "The Flying Cloud," which sailed the Seven Seas under the American flag in the middle of the last century. The campaign which will begin on March 1, to continue for five months through July, will be called the "Man-the-Sales" contest.

As in other years, the campaign will be conducted by the Refrigeration Committee and sponsored by Servel, Inc., through the Association of Gas Appliance and Equipment Manufacturers. The plans for the drive were adopted at a meeting of the recently-formed 1939 Committee held in the board room of the American Gas Association in the Graybar Building, New York City on January 12. The cash prizes and trophies will be awarded for record sales of Servel Electrolux gas refrigerators.

The trophies for winning companies will be replicas of "The Flying Cloud." The trophy was chosen as a symbol of successful salesmanship, as it was the feeling of the Committee that these are times when salesmen could not do better than emulate the spirit of the men who "manned the sails" of the clipper ships. The theme of the campaign was created and developed by H. S. Boyle, sales promotion manager of Servel, Inc.

The objectives of the campaign are: first, the replacing of out-moded iceboxes, the national average of which is estimated to one in every other American home; second, the placing of gas refrigerators in the new apartments and new homes throughout the country; and third, the most important market of all, placing gas refrigerators in homes where mechanical refrigerators have become obsolete.

Refrigeration Committee Members View Trophy

Members of the new 1939 A. G. A. Refrigeration Committee view model of "The Flying Cloud," famous American clipper ship, which is to be this year's trophy for gas company winners in the "Man-the-Sales" contest beginning on March 1, and continuing through July. The photograph was taken on the occasion of the first meeting of the Committee held in the board room of the American Gas Association in the Graybar Building, New York City. Those in the picture are: FRONT ROW: Sitting (left to right) J. W. West, Jr., secretary of the Committee; H. C. Porter, new business manager, Kansas City Gas Co.; R. J. Rutherford, vice-president, Worcester Gas Light Co., chairman of the Committee; Louis Ruthenburg, president of Servel, Inc., a guest of the Committee at the meeting; A. J. Maloney, retail sales manager, Washington Gas Light Co., Washington, D. C. BACK ROW: Standing (left to right) E. G. Peabody, Citizens Gas and Coke Utility, Indianapolis, Ind.; E. E. Linburg, manager of gas division, Metropolitan Edison Co., Easton, Pa.; O. J. Haagen, appliance sales manager, Ohio Fuel Gas Co., Columbus; H. S. Boyle, sales promotion manager, Servel, Inc.; H. D. Valentine, People's Gas Light and Coke Co., Chicago, Ill.; J. A. Sackett, sales manager, Kings County Lighting Co., Brooklyn, N. Y.; E. J. Boyer, sales manager, Minneapolis Gas Light Co., and F. E. Sellman, representing the Association of Gas Appliance and Equipment Manufacturers. Other members of the committee not appearing in the picture are H. R. Sterrett, President New Haven Gas Light Co.; B. T. Franck, Michigan Consolidated Gas Co.; J. W. Lea, Atlantic Gas Light Co.; George Stang, Brooklyn Borough Gas Co., and W. M. Jacobs, Southern California Gas Co.

Roll of Brooklyn Union to Captain A.G.A. Commercial Baking Group

Announcement has been made by Frank H. Trembly, Jr., Chairman of the Industrial Gas Section of the American Gas Association, that Carlton W. Roll, long the commercial baking expert for The Brooklyn Union Gas Company, has been appointed to chairman the activities of the Section's Commercial Baking Committee, which in 1939 will operate on somewhat of a different basis than heretofore. This year the Commercial Baking Group will concern itself with both the large and the small (or "corner") bakery, whereas heretofore the committee was only interested in larger scale operations.

Studies of sales methods and economics of gas utilization will be undertaken, with particular attention focussed upon the many new types of smaller ovens, such as the three or four-tray reel oven and those deck ovens on which new and different firing and control arrangements are being used. The sales possibilities and present status of such ovens, in addition to peel, cabinet, and rotary types, will be reported upon. Nor will the position of gas fuel in large-scale and national chain baking be neglected.

Mr. Roll is well-known in the baking industry, both nationally and locally, which fact will greatly facilitate productive work by his committee. Reports of business-winning value to non-residential gas men throughout the country are expected.

DeKrafft Joins Board of Brooklyn Union Gas Co.

William de Krafft, former chairman of the U. S. Rubber Co. finance committee, has been elected a director of Brooklyn Union Gas Co., succeeding the late James H. Jourdan. Mr. de Krafft, now a business consultant, played a leading role in the financial reorganization of U. S. Rubber from 1929 to his resignation last year.

Roper Sales Campaign Portfolio

Geo. D. Roper Corp., Rockford, Ill., have issued their new sales-helps manuals for 1939. They are issued in two parts. One part illustrates and describes each number. To enable salesmen to know the function of all parts a skeleton range is shown with arrows pointing to each part giving the name of the part. This enables the prospect to get a comprehensive idea of how all the parts function. Several pages are devoted to illustrations of various important parts, which, as a whole, makes the range function perfectly and economically. All the material is written in style to be easily understandable by the prospective purchaser.

The second part contains a comprehensive program available for immediate use in announcing the new Roper ranges, covering effective display backgrounds, signs, display boards, etc. It shows various handle trims available. Sample booklets printed in colors and a booklet containing complete campaign suggestions are available on request.

Columbia Course Offers Review Of Practices in American Gas Industry

A brief outline of the subject matter covered in the Columbia University home study course in American Gas Practice follows. A new class is now forming.

PART 1

1. History and function of the manufactured gas business, physical characteristics of gases, fuel gases and their composition, components of fuel gases, occurrences and production of natural gas.
2. The heating of gas making apparatus, coals and their relation to coal gas.
3. The carbonization of coal, general outline of a coal gas plant, gas works refractories, construction of horizontal retort plants.
4. Operation of retort carbonizing systems, construction and operation of coke ovens.
5. By-product recovery in coke ovens; conveying, crushing and screening; boiler plants in gas works.
6. Blue gas theory, construction and operation of blue gas plants.
7. Theory of carburetion; construction and regular operation of carburetted blue gas plants.
8. The use of heavy oils and of special operating procedures and carburetted blue gas apparatus; Pacific coast oil gas.
9. Dayton and Faber oil gas processes; reforming of hydrocarbon gases; liquefied petroleum gases in gas production; condensing and exhausting gas.
10. Theory of scrubbing and application of condensing and scrubbing.
11. Distillation of ammoniacal liquor; removal of sulfur by oxide and liquid purification.
12. Gas conditioning; low temperature carbonization; complete gasification; elements of gas plant design; history of developments and future problems in the gas industry.

PART 2

1. Storage of gas, gas mains and installation of gas mains up to pipe joints.
2. Pipe joints, pipe specials, pipe corrosion and protection, final steps in installation of mains, and maintenance of mains.
3. Services, compressors or boosters, gas governors or pressure regulators, and gas mixing.
4. Station meters and consumers' meters.
5. Flow formulas, gas loads and pressure surveys, unaccounted-for gas, types of distribution systems, calculations of distribution design, economics of gas distribution, and long distance transmission.
6. New business department, composition of fuel gases, combustion reactions, combustion of mixed gases, and mechanism of combustion of gases.
7. Atmospheric gas burners and their design, testing of gas appliances, burners for mixed gases, change-over procedures, the gas range, and water heaters.
8. Refrigeration, other household appliances, heat capacity, heat transfer, heat losses, heat balances, and recovery of waste heat.
9. Temperature measurement, temperature control, house heating, air conditioning, heating and cooling accessories.
10. Industrial burner systems, standard industrial furnaces, and gas furnace design.
11. Selection of an industrial fuel, testing and research department, safety, accident prevention, and first aid.
12. Accounting and statistics, principles of rate making, and public relations.

George F. Mitchell Elected Vice-Chairman A.G.A. Advertising Committee

Having recently been appointed a member of the committee in charge of the gas industry's national advertising program, George F. Mitchell, of Chicago, president of The People's Gas Light & Coke Company, has been elected vice-chairman of the committee. The national advertising program is sponsored by more than 700 gas companies in the United States and is cleared through the American Gas Association of New York, of which Mr. Mitchell is a director.

Improved Equipment—Russell Engineering in New Quarters

Improved Equipment — Russell Engineering Division of Combustion Utilities Corporation have moved their engineering and sales offices from 24 State Street to 60 Wall Street, New York.

NEW

SMYLY H_2S Tester

WITH PRE-TREATED TEST DISKS

"Handiest device of its kind," say gas men who have used it. No messy lead acetate solution. Quick, accurate tests made in a jiffy using dry pretreated paper disks. Pays for itself in time saved alone. Write today for Free Bulletin.

CUT PURIFICATION COSTS

Reductions in purification costs up to 50% have resulted from recommendations of Connelly Engineering Department. Connelly's complete purification service is saving gas companies thousands of dollars annually. Write for details.

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Chicago, Ill. Elizabeth, N. J.

COPPER TO COPPER GAS STOVE STOP

Typical of Hays' work to Gas Company Specifications is this copper to copper gas stove stop. It features Hays Double Seal Connections, the only copper connection that provides 2 seals (45° plus 90°). The 45° seat holds the copper pipe in a wedge—the 90° seat locks it in place and absorbs all strain and vibration. Double Seals were selected over all other copper fittings to pipe costly and dangerous anaesthetic gases to 23 operating rooms of a great hospital—proof of their tightness.

Use Hays Double Seals and copper pipe for your installation gas piping work. They are approved by Underwriters' Laboratories. Write for catalog.

HAYS MFG. CO., ERIE, PA.

Catalogs

Refractories. Catalog H. G. 501 of Quigley Company, 56 W. 45th Street, New York, is a colorful and well illustrated presentation of the plastic and granular refractories made and marketed by this Company, including those having special insulating properties. While dealing with their application for many industrial uses, the catalog illustrates and features their application to boiler settings, gas benches, water gas sets, coke ovens, gas producers, retorts, recuperators and industrial furnaces. The use of the Quigley refractory gun for applying refractories is also described. Copy of this catalog on request.

Gas Burning Equipment. Low pressure air-gas induction mixers for manufactured, mixed and natural gas, also high pressure gas inspirators, air boosters and burner nozzles, are described in detail in Catalog 802 of Hauck Manufacturing Co., 124-10th St., Brooklyn, N. Y.

Water Gauge Illuminator. A folder No. 505 issued by Wright Austin Co. of Detroit describes the "Plainsite" water gauge employing Neon illumination. Clear visibility from any distance or angle is shown by diagrams and illustrations.

Remote Recorder and Controller. American Meter Company, Inc., has issued a new Bulletin (E-22) describing an air actuated remote recorder and controller.

This instrument is devised for accurate recording and control of rate of flow or pressure of gas, air, steam or fluid, or for the recording and control of liquid level.

Sensitive yet rugged in construction, the instrument is particularly adapted to industrial processes where ordinary connecting lines are subject to freezing (unless steam traced or jacketed), or to gas formation in liquid lines or condensation of liquid in gas lines; or where it is desired to exclude main-line high pressures or such gases as propane or butane from the control room.

Copies of bulletin may be procured from Metric Metal Works of American Meter Company, Erie, Pa., from the general office, 60 East 42nd Street, New York, or any branch office.

Gas Service Regulators. Described in Bulletin 43C of Fisher Governor Co., Marshalltown, Ia., are gas service regulators, safety shut-off service regulators, field regulators and low pressure test gauges. Construction features and principles of operation are covered.

Space Heaters. "Hotstream" wall insert heaters are described in bulletin 10W.I. issued by The Hotstream Heater Co., Cleveland, Ohio. These afford comfortable heating for bathrooms, halls and small rooms at low operating cost. Furnished in colors to match fixtures of outstanding sanitary fixture manufacturers.

Automatic Water Heaters. Bulletin 10H.B. of Hotstream Heater Company of Cleveland, Ohio, describes the "Hotstream 4-in-1 Booster." This gas-fired water heater may be used as a complete unit or as a booster to an established water heating plant. May be installed as single or multiple unit hook-up. Has multi-flue cop-r-loy tank, insulated with rockwool, safety pilot and thermostat that can be set to desired temperature. Approved by A.G.A.

Multi-Seal Rivets. These are described in bulletin issued by Multi-Seal Corporation, 123 North Jefferson St., Chicago. They are used to repair small holes in tanks, to rivet plates over large holes, seal cracks, replace loose rivets, etc. The same bulletin describes their Multi-Seal pipe connectors for pipe lines, tanks, boilers and other metal containers.

Feed Water Regulators. The 1939 catalog of The Chaplin-Fulton Manufacturing Co., 28 Penn Avenue, Pittsburgh, gives a clear-cut description of the "Vigilant" Feed Water Regulator and other steam specialties manufactured by this Company. The catalog is well illustrated throughout and printed in large, easy reading text. Numerous detail drawings, capacities of equipment and price lists are included.

"Controlled Valves," an illustrated 27-page booklet, issued by The Foxboro Company, Foxboro, Mass., describes the two generally used types of air-operated controlled valves; the quick-opening type for open and shut control, and the Stabilflo type for throttling control.

Detailed information about these two types of valves is contained in specification charts, power curves, pressure-temperature ratings and valve formulas. Diagrams, photos and complete details of lubrication bonnets, louvre dampers, pneumatic switches, remote valve control, air compressors and air filter sets are shown in various sections of the booklet.

For engineers who frequently compute valve sizes, The Foxboro Company, according to the bulletin, is offering a new pocket-size slide rule, scales for liquid, gas and steam calculations, direct-reading in valve sizes. This 6-inch valve rule, in a leather case, is sent free to engineers who request it on their business letterhead. Useful equations are included for determining the size of a controlled valve when it is in a steam line to a direct-acting pump.

Copies of the bulletin, 214-1, may be obtained by writing to The Foxboro Company.

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Canadian Notes

HAMILTON, ONT.—Shareholders of Union Gas Co., at a special meeting in Chatham, a few days ago, approved the arrangement wereby United Gas and Fuel Co., a subsidiary of United Fuel Investments, Ltd., acquires the Hamilton properties and business of Dominion Natural Gas Co. Union Gas, which holds more than 99 per cent of the common stock of United Fuel, will surrender half its holdings to Dominion Natural Gas, and United Fuel will pay Union Gas $180,000 in cash. Hamilton's municipal council has approved the purchase of Dominion Natural Gas Company's business in the Hamilton area and a special general meeting of preferred shareholders of United Fuel was held on Dec. 16, and passed favorably upon same.

NORWICH, ONT.—The ratepayers of this town, gave approval by a large majority to the by-law providing the Povec Syndicate, a new natural gas pipe line company composed of prominent residents of Tillsonburg, with a franchise to supply the municipality with gas for commercial and domestic use. The Syndicate has, in accordance with the clause in its agreement, already commenced the drilling of wells on land that it has now held under lease, in the vicinity of Courtland, a distance of twelve miles from Norwich.

WOODSTOCK, ONT.—The Ontario Municipal Board, at a special session, held recently in the Court House here, granted the application of the Oxford Pipe Line Co., Ltd., Brownsville, for a certificate under the Public Conveniences and Necessities Act for the right to distribute natural gas throughout the township of North Oxford. The company has completed a contract to supply natural gas to the huge lime quarries at Beachville, in North Oxford, whose consumption of coal amounts to thousands of tons per annum. It is considered by experts that natural gas will be more efficient and cheaper for burning the lime.

CALGARY, ALTA.—One of the wonders of Western Canada, the gigantic night flares of burning natural gas in the Turner Valley forty miles south of this city, which have wasted billions of cubic feet of natural gas, will be extinguished. It will cease before next spring, when plans of Alberta petroleum and natural gas conservation board, are completed. All gas, except for fuel purposes in Calgary, and southern towns, will be returned to the limestone under a compulsory repressuring scheme.

HYTEMPITE
(Reg. U. S. PAT. OFF.)

A Plastic Air-setting High Temperature Cement for Bonding Refractory Brick and Shapes

Superintendent of a large New England gas works informs us: "We have used HYTEMPITE for the past 12 years for laying the silica brick walls of our retorts and have never known a failure. We find HYTEMPITE meets every requirement for a high-temperature cement, and we never need to worry about the results."

Florida gas plant superintendent says: "We have tried all kinds of high-temperature cements, but none equals HYTEMPITE."

QUIGLEY COMPANY INC.
Manufacturers of Industrial Specialties
56 West 45th Street, New York
Distributors with Stock and Service in every Industrial Center

Cost of Sulphur Removal Guaranteed

Announcement of the new Guaranteed Cost Plan introduced by the makers of Lavino Activated Oxides is contained in a new brochure fully describing this unusual offer, which has been made possible by recent important improvements in the Oxides. Copy of the brochure may be obtained by writing E. J. Lavino and Company, 1528 Walnut St., Philadelphia, Pa.

Winter Air Conditioning Forced Warm-Air Heating

Based primarily on results of research at the University of Illinois, as published in University of Illinois Engineering Experiment Station Bulletin No. 266. Includes supplemental data from other sources.

Edited by S. KONZO

Special Research Assistant Professor in Mechanical Engineering, University of Illinois; Member A.S.H.V.E. and Honorary Member National Warm Air Heating and Air Conditioning Association.

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2 Comparison of the Gravity Warm-Air Heating Plant and the Forced-Air Heating Plant
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4 Wet- and Dry-Bulb Temperatures and Relative Humidity
5 Comfort Chart and Effective Temperatures
6 Humidification Requirements and Limitations
7 Humidification and Humidity Controls
8 Ventilation and Infiltration
9 Filtration of Air and Air Filters
10 Room Air Temperatures—Differentials and Variations
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12 Reduction of Heat Loss From House, and Insulation
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14 General Performance Characteristics of a Forced-Air Heating System
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28 Trunk Duct Systems
29 Special Modified Forms of Duct Design
30 Selection of Furnaces and Burners
31 Furnace Capacities and Efficiencies
32 Chimneys and Draft
Appendix A, B, C and Index

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Automatic Heater Accessories
Competitive Water Heating
Hot Water—For What?

"A Book like this has long been needed to enable our salesmen to present a sound and convincing attack on this most worthwhile business of our industry."—A. M. Beebee, Gen. Supt. Gas Dept., Rochester G & E Co., Rochester, N. Y.

"A Real contribution to the gas industry."—R. A. Koehler, Chairman, A.G.A. Water Heating Committee.

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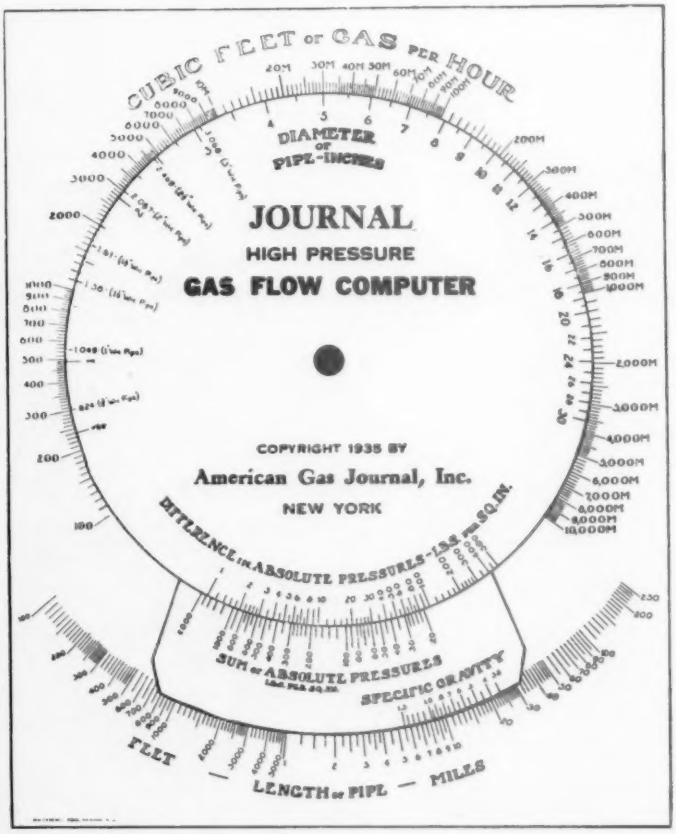

New Improved Gas Flow Computers now available of durable celluloid, encased in a convenient leatherette cover with complete instructions.

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Diameter of Pipe Inches ¾-30
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Sum of Absolute Pressures—Lbs. per sq. in 2000-20
Specific Gravity 1.5-.35
Length of Pipe—Feet 100-5000
Length of Pipe—Miles 1-250

Low Pressure Computer Range:

Cu. Ft. of Gas Per Hour—10 to 500 M
Pipe Diameter ¾" to 48" (including standard and actual weight up to 4")
Pressure Loss Inches .01-10.
Length of Pipe—Feet 30-30,000
Specific Gravity 1.5-.35
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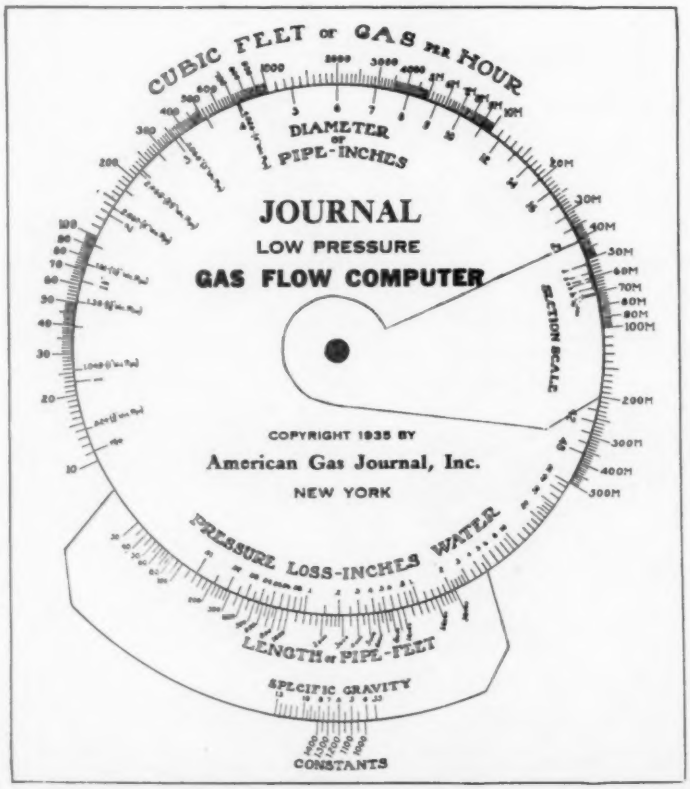

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Fuel Flexibility

(Continued from page 11)

ufactured gas industry with clogged orifices and sticking valve seats. Nor to the natural gas companies is the appliance regulator anything but an overall help which most operators regard as being virtually indispensable. And the CP range has at least three times the number of gas adjustments as the refrigerator.

The added initial expense of equipping a range with fixed orifices and individual regulator is under two dollars, or what amounts to less than the direct expense of *one* service call with all elements of cost considered. Those utilities now employing the individual regulator on new range installations confidently state that the full initial cost is returned within less than two years on savings in service expense alone.[5] These experimental utilities report appreciable benefits to their collection departments, to increased sales prospects from more enthusiastic users and general improvement to public good will. All astute retailers agree that the most important time a range is used is the first. Satisfied range owners are a fertile opportunity for multiple use sales. Fixed orifices and a regulator set at a half inch (½") water column below the lowest normal pressure would go far towards insuring perfect operation from the very beginning.

Many are the firm adherents of the fixed orifice—regulator method, and many are its opponents. But often times change is confused with progress. The case for the method argues well. Those operators who have daringly perhaps taken the plunge constitute the method's staunchest supporters. At least the debate will furnish food for thought and possibly grounds for genuine progress.

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[5] *Among those who have had representative experience with the use of the individual pressure regulator on each new range installation are Knoxville, Tenn., Lynchburg, Va., Providence, R. I., and Cambridge, Mass., to name but a brief list. In but few instances, however, have these experiments combined the use of the fixed orifice with the pressure regulator largely because of the manufacturers' indifference or reluctance to furnish suitable spuds. Proper orifices would permit through the use of a simple water column to set all gas adjustments, merely by the one operation of adjusting the appliance regulator at a predetermined point (2½" would cover most distribution systems).*

Several eastern companies, notably Rochester, N. Y., Springfield, Mass., to mention but a few, have effectively reduced service complaints by uncrating, completely inspecting and adjusting all burners and mechanisms at a central warehouse by highly skilled operatives. This approach is manifestly limited to the relatively large companies. The replacement of the typical service man deploying upon the floor in the customers' kitchens by trained experts working under favorable central conditions has much to recommend such procedure.

In the next issue Mr. Merriam will discuss additional aspects of this important subject.—Ed.

The Melting of Metals

(Continued from page 18)

mand special precautions against crucible breakage and metal loss in general. Unlike the "baser metals," oxidation is not a problem with the "noble metals" as none of them form an oxide on heating in air. Hence it is not necessary to carry a flame that is slightly reducing. As a matter of fact, the oxy-gas torch is used widely by the manufacturing jeweler for melting the small quantities of precious metals that he usually deals in.

Platinum melts at 3191° F. and hence can be considered as out of the range of normal gas melting, although the oxy-gas torch in the jewelers' hands is generally satisfactory for their work.

Conclusion

Any article on the melting of metals would be far from complete if the immersion method of gas firing, now so widely used for the soft metals, was left out of the discussion. The highest efficiency so far possible with gas firing belongs to the immersion method. It has completely captured the stereotype field, and is rapidly consolidating its position for the melting of lead, tin and zinc. (See AMERICAN GAS JOURNAL, April, 1938). With progress in the manufacture of heat resisting alloy tubes, it will reach into the field of the present crucible furnace.

This article has likewise failed to take up the melting of steel in open hearth furnaces, an operation of great importance to those gas companies with natural gas at very low rates situated in the steel districts, but hardly an everyday problem with the others. It has been our object throughout to cover as far as possible the run-of-mine activities of the industrial gas engineer and the basic principles involved. It is hoped that this article on melting has helped to do so, for certainly the melting of the metals of industry offers one of the greatest fields for industrial gas usage.

General Refractories Appointments

James P. Raugh has been appointed General Sales Manager of General Refractories Company, Philadelphia, Pa., effective January 1, 1939. Mr. Raugh joined the sales personnel of the Pittsburgh Office of General Refractories Company in 1929 following graduation from the United States Naval Academy and several years in the naval service. Later he became District Sales Manager of the Detroit and Cleveland Offices, and during the past three years has been Assistant General Sales Manager.

Fred M. Miller has been appointed General Works Manager of General Refractories Company, Philadelphia, Pa., effective January 1, 1939. Mr. Miller was graduated from Oregon State College in Mechanical Engineering, where he also served on the faculty, and attended the University of Illinois. Prior to joining General Refractories Company in 1924 as Chief Engineer, he had been for nine years in the engineering and operating divisions of the Coke Oven Departments of Youngstown Sheet & Tube Company, Colorado Fuel & Iron Company, American Coke & Chemical Company and St. Louis Coke & Iron Company.

A. C. Shape has been appointed Acting Chief Engineer to succeed Mr. Miller.

Wailes Dove-Hermiston Co. Appoints New Distributors

Announcement is made by J. F. Sorzano, Manager of the Industrial Division of Wailes Dove-Hermiston Corporation, New York City, of the appointment of Robinson, Cary & Sands Company, Saint Paul, Minn.; Stokes Engineering & Supply Company, Easton, Pa.; Strong, Carlisle & Hammond Company, 1392 West 3rd Street, Cleveland, Ohio; and the C. W. Marwedel Company, 1235 Mission Street, San Francisco, California, as distributors of the Bitumastic line of maintenance protective coatings.

Proposed 75-mile Natural Gas Pipe Line from Louisiana to Arkansas

The Federal Power Commission announces its receipt of an application by the Louisiana-Nevada Transit Company for a certificate of public convenience and necessity authorizing the construction and operation of an 8⅝ inch pipe line for the transportation of natural gas from the Cotton Valley Field in Webster Parish, Louisiana, to the plant of the Ideal Cement Company in Okay, Arkansas, a distance of approximately 75 miles. Estimated cost of the proposed facilities is stated to be $356,312, and the line is said to be capable of transporting ten million or more feet of natural gas per 24-hour day.

The applicant states that it has entered into a contract to supply the Ideal Cement Company with natural gas for a ten-year period beginning August 29, 1939, at the rate of 10 cents per thousand cubic feet, and that natural gas is essential to the operation of the cement company's plant.

The Louisiana-Nevada company says that, if granted the certificate of convenience and necessity, it will at all times construct such main, lateral or branch pipe lines as may be necessary.

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